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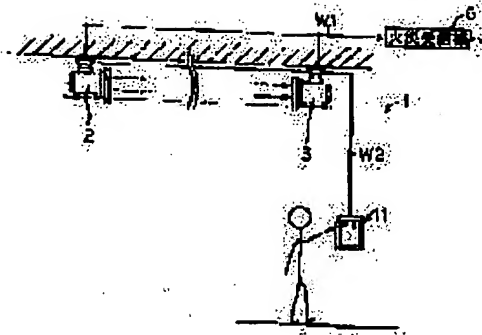
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(54) PHOTOELECTRICALLY SEPARATE SENSOR WITH RECEIVED LIGHT  
QUANTITY DISPLAY UNIT AND PHOTOELECTRICALLY SEPARATE  
SENSOR WITH WAVEFORM CONFIRMATION TERMINAL UNIT



(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a photoelectrically separate sensor with a received light quantity display unit which adjusts received light quantity and easily examines the cause of trouble, etc., even without making a person who performs maintenance and inspection climb to a high place such as a ceiling where the photoelectrically separate sensor is attached even when the photoelectrically separate sensor is to be adjusted or when trouble, etc., takes place.

**SOLUTION:** A received light quantity display unit 11 which shows a received light level of a photodetector 3c is further connected to photoelectrically separate sensors 2 and 3 through signal wire W1, and the received light quantity of the element 3a can be confirmed by the unit 11. Because the unit 11 is newly provided, it is possible to confirm the received light quantity of the photodetector by the unit 11 even without

making a person who performs maintenance and inspection bother to climb a place where the sensor is attached in order to inspect the cause when the photoelectrically separate sensors are to be adjusted or when trouble takes place. Then, it is possible to easily and also simply know the causes of trouble or wrong signal of the photoelectrically separate sensors.

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## DETAILED DESCRIPTION

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[Detailed description]

[0001]

[The technical field to which invention belongs] this invention relates to the photoelectrical formula discrete-type sensor with a light income display unit and the photoelectrical formula discrete-type sensor with a wave authentication terminal unit with

which a maintenance and a checker do not reach the heights in which the photoelectrical formula discrete-type sensor is attached, such as head lining, but \*\* also enabled it to investigate causes, such as the trouble, simply, when the time of construction of a photoelectrical formula discrete-type sensor, a trouble, etc. occur about a photoelectrical formula discrete-type sensor.

[0002]

[Prior art] Recently, the photoelectrical formula discrete-type sensor is installed in buildings, such as an apartment house and a building. Drawing 11 is the block diagram showing the conventional photoelectrical formula discrete-type sensor roughly. As shown in drawing 11, it dissociates and opposite arrangement of the photoelectrical formula discrete-type sensor 101 is carried out so that an optical axis may be in agreement in the light transmission machine 102 which has a light emitting device, and the electric eye 103 which has a photo detector, and it discharges a pulsed light intermittently from the light transmission machine 102, and is made to \*\*\*\* by the electric eye 103. The electric eye 103 is connected to the fire receiver 106 through the signal line W101.

[0003] The photoelectrical formula discrete-type sensor 101 distinguishes the existence of a fire using the principle that the \*\*\*\* level which \*\*\*\*s by the electric eye 103 declines, by the smoke which flowed between the light transmission machine 102 and the electric eye 103, when a fire breaks out. The photoelectrical formula discrete-type sensor 101 shown in drawing 12 (a) is electric-eye 103 the very thing, and shows the photoelectrical formula discrete-type sensor for P type which was made to distinguish the fire.

[0004] Moreover, photoelectrical formula discrete-type sensor 101a shown in drawing 12 (b) is the fire receiver 106 connected to sensor 101a, and shows the photoelectrical formula discrete-type sensor for R forms which was made to distinguish the fire. The photoelectrical formula discrete-type sensor 101 for P type is a microcomputer (generally) in an electric eye 103. The thing 104 dedicated in 1 board as an object for device nests called a microcomputer not only including CPU function but including circumference chips, such as memory and an interface circuitry Have power and the \*\*\*\* circuit 105 and threshold Lth is beforehand stored in a microcomputer 104 as \*\*\*\* level of an electric eye 103. When \*\*\*\* level L which the electric eye 103 \*\*\*\*ed becomes below the threshold Lth ( $L \leq L_{th}$ ), it judges it as a fire, drives power and the \*\*\*\* circuit 105, and is made to \*\*\*\* fire alarm by the fire receiver 106.

[0005] moreover, in another photoelectrical formula discrete-type sensor 101a for R forms The microcomputer 104 is built in in the electric eye 103, and they are the fire receiver 106 or a repeater (it does not illustrate.) from a microcomputer 104. Firm output of the analog value which the electric eye 103 \*\*\*\*ed is carried out. to the fire receiver 106 Threshold Lth is made to memorize beforehand as \*\*\*\* level of an electric eye 103, and when \*\*\*\* level L which the electric eye 103 \*\*\*\*ed becomes below the threshold Lth ( $L \leq L_{th}$ ), it is made to \*\*\*\* fire alarm with the fire receiver 106.

[0006] In addition, the component equipment shown by 108 shows the amplifier circuit which amplifies the light income which photo-detector 103a of an electric eye 103 \*\*\*\*ed among drawing 12 (a) and drawing 12 (b). Since there are secular change that that dust adheres etc. results and the photographic sensitivity of an electric eye 103 changes after the conventional photoelectrical formula discrete-type sensors 101 and 101a attach the photoelectrical formula discrete-type sensors 101 and 101a in head lining

etc., a maintenance and a checker need to perform depuration, check, and adjustment of the photoelectrical formula discrete-type sensors 101 and 101a suitably.

[0007] Moreover, since an alarm will be outputted if an automatic amendment becomes impossible for \*\*\*\* level if it is in some to which \*\*\*\* level zero offset capability is attached, a maintenance and a checker are performing check and adjustment, after cleaning the photoelectrical formula discrete-type sensors 101 and 101a which outputted the alarm.

[0008]

[Object of the Invention] By the way, when the adjustment, the trouble, and false report accompanied by secular change occur in the conventional photoelectrical formula discrete-type sensors 101 and 101a, in order to find the cause, the light income adjustment change-over switch (light income adjustment change-over switch 111 shown in drawing 11) is prepared in the side face of an electric eye 103, the light income adjustment change-over switch 111 is switched, and the light income of an electric eye 103 is insufficient, or is carrying out proper or excessive authentication.

[0009] Moreover, it is drawn from the output terminal of the amplifier circuit 108 by the side face of an electric eye 103. The output terminal for detecting the voltage level (wave) outputted from the amplifier circuit 108 (it does not illustrate.) It prepares and is an output terminal (it does not illustrate.). Wave metering devices, such as an oscilloscope (it does not illustrate.) If it connects, there is also a thing which enables it to investigate whether the \*\*\*\* level of photo-detector 103a which photo-detector 103a of an electric eye 103 \*\*\*\*ed, and was amplified with the wave metering device in the amplifier circuit 108 is proper.

[0010] However, since the electric eye 103 is generally attached in heights, such as head lining of a building When the adjustment and the trouble accompanied by the time of construction of the photoelectrical formula discrete-type sensors 101 and 101a or secular change occur Since the photoelectrical formula discrete-type sensors 101 and 101a are attached in heights, such as head lining, a maintenance and a checker As shown in drawing 11, in order to investigate adjustment of the photoelectrical formula discrete-type sensors 101 and 101a, a trouble, and the cause of a false report Moreover, scaffolds, such as a stepladder and a ladder, were needed, it reached on the stepladder or the ladder, and it is in the bad status of such a scaffold, and there was a problem that maintenance / check work had to be performed.

[0011] When it is made in order that this invention may solve the above problems, and constructing a photoelectrical formula discrete-type sensor, when a trouble occurs, a maintenance and a checker Without reaching a stepladder, a ladder, etc., it is a low place and the light income of an electric eye 103 can check whether it is proper easily and easily. further It aims at offering the photoelectrical formula discrete-type sensor with a light income display unit and the photoelectrical formula discrete-type sensor with a wave authentication terminal unit which enabled it to correct the light income of an electric eye 103 to a proper value easily and simply in a low place.

[0012]

[The means for solving a technical problem] The photoelectrical formula discrete-type sensor given in a claim 1 with a light income display unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between a light transmission machine and an

electric eye by detecting the decrement of the light irradiated from a light emitting device which a photo detector \*\*\*\*s The existence of a fire was distinguished, and the light income display unit on which an electric eye is made to display the \*\*\*\* level of a photo detector through a signal line is connected, and it enabled it to check the light income level of a photo detector in a light income display unit further to the photoelectrical formula discrete-type sensor which \*\*\*\*s fire alarm to a fire receiver.

[0013] In this photoelectrical formula discrete-type sensor with a light income display unit, since it does not reach purposely to the place in which the sensor is attached but \*\* also enabled it to check the light income level of a photo detector in a light income display unit when a light income display unit is newly prepared and a trouble and a false report occur in a photoelectrical formula discrete-type sensor in order that a maintenance and a checker might investigate the cause, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0014] The photoelectrical formula discrete-type sensor given in a claim 2 with a light income display unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the light emitting device which a photo detector \*\*\*\*s is outputted to a fire receiver. by the fire receiver side Based on the light income which the photo detector \*\*\*\*ed, the light income display unit on which the \*\*\*\* level of a photo detector is displayed through a signal line is further connected to the photoelectrical formula discrete-type sensor which is made to \*\*\*\* fire alarm. in a light income display unit It enabled it to check the light income level of a photo detector.

[0015] Since it does not reach purposely to the place in which the sensor is attached but \*\* also enables it to check the light income level of a photo detector in a light income display unit when a light income display unit is newly prepared and a trouble and a false report occur in a photoelectrical formula discrete-type sensor also with this photoelectrical formula discrete-type sensor with a light income display unit in order that a maintenance and a checker may investigate the cause, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0016] The photoelectrical formula discrete-type sensor given in a claim 3 with a light income display unit The light income display unit of the photoelectrical formula discrete-type sensor given in the claim 1 or the claim 2 with a light income display unit If it has a fire supervision mode, the light income adjustment mode of a photo detector, the light income level display means of the light income of a photo detector, and a light income adjustment means to adjust the light income of a photo detector and selection operation of the light income adjustment mode of a photo detector is carried out So that the light income of the photo detector as which the light income of the photo detector at the time of the light income adjustment mode being chosen is displayed on a light income level display means, and is displayed on the light income level display means may become a proper value If a light income adjustment means is adjusted, the light income of a photo detector will be made to become proper.

[0017] In this photoelectrical formula discrete-type sensor with a light income display unit, since the light income adjustment mode and the light income adjustment means are prepared in the light income display unit, in case the light income level of the photo detector of a photoelectrical formula discrete-type sensor is adjusted, a maintenance and a

checker are not purposely reached to the place in which the sensor is attached, but \*\* is also a light income display unit and it can adjust the light income level of a photo detector for it easily and easily.

[0018] The photoelectrical formula discrete-type sensor given in a claim 4 with a light income display unit is either of the display meanses, such as a lamp of pluralities [ means / light income level display / of the photoelectrical formula discrete-type sensor given in a claim 3 with a light income display unit ], such as Light Emitting Diode, a level meter, CRT, and liquid crystal. Anything can be used if it is the display means for which a maintenance and a checker understand the light income level of a photo detector easily as a light income display unit.

[0019] Therefore, by using two or more lamps, level meters, CRT, liquid crystal, etc. as a light income level display means to display the light income level of a photo detector, the variation of goods can be extended and, thereby, the goods which suited the needs of the diversified customer can be supplied now to a commercial scene. The photoelectrical formula discrete-type sensor given in a claim 5 with a light income display unit is equipped with the lamp turned on when the light income level of a photo detector runs short of the light income level display meanses of a light income display unit of the photoelectrical formula discrete-type sensor given in a claim 3 with a light income display unit, the lamp turned on when the light income level of a photo detector is proper, and the lamp turned on when the light income level of a photo detector is excessive.

[0020] the case where the light income adjustment mode is chosen in this photoelectrical formula discrete-type sensor with a light income display unit -- as long as -- any of two or more lamps when either of two or more lamps is made to light up and the fire supervision mode is chosen -- although -- it is made not to switch on the light The consumed electric current in case the fire supervision mode is chosen can be stopped low by this, and it is also enabled to connect many photoelectrical formula discrete-type sensors with a light income display unit to one supply power.

[0021] Moreover, since the lamp is chosen as a display means to display the light income level of a photo detector, in this photoelectrical formula discrete-type sensor with a light income display unit, the light income level of a photo detector is visually intelligible. And since the lamp is cheap if Light Emitting Diode is used, it can supply the cheap photoelectrical formula discrete-type sensor with a light income display unit to a commercial scene.

[0022] The photoelectrical formula discrete-type sensor given in a claim 6 with a light income display unit If selection operation of the light income adjustment mode of a photo detector of the photoelectrical formula discrete-type sensor given in a claim 5 with a light income display unit is carried out It is based on the light income of the photo detector at the time of the light income adjustment mode being chosen. the lamp turned on when the lamp and the light income level of a photo detector which are turned on when the light income level of a photo detector is insufficient are proper -- and Either of the lamps turned on when the light income level of a photo detector is excessive lights up, and either of these lamps is made to turn on by adjusting a light income adjustment means.

[0023] Thereby, seeing the lighting status of these lamps, if the light income adjustment mode is chosen, a maintenance and a checker are easy operations of adjusting a light income adjustment means, and can adjust the light income level of the photo detector of an electric eye to a proper value so that the lamp turned on when the light income level of

a photo detector is proper may light up. The photoelectrical formula discrete-type sensor given in a claim 7 with a light income display unit prepared the wave authentication terminal which detects further the voltage variation based on the light income which the photo detector \*\*\*\*ed in the light income display unit of the photoelectrical formula discrete-type sensor given in either of the claims 1-6 with a light income display unit. [0024] In this photoelectrical formula discrete-type sensor with a light income display unit Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the light income display unit, a maintenance and a checker The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily only by connecting wave display, such as an oscilloscope, to the wave authentication terminal with which it does not reach to the place in which the sensor is attached, but \*\* was also prepared in the light income display unit purposely.

[0025] The photoelectrical formula discrete-type sensor with a light income display unit of a publication is set as the claim 8 in the photoelectrical formula discrete-type sensor given in either of the claims 3-7 with a light income display unit shorter than the time rate of instrumentation of in a fire supervision mode in the time rate of the instrumentation of light income level in the light income adjustment mode of a photo detector of light income level. A photo detector is measured in a desirable example, light income level is measured at 1 time of a rate at 1 second, and a photo detector has light income level measured by 5 seconds at 1 time of a rate in the light income adjustment mode at a fire supervision mode.

[0026] In this photoelectrical formula discrete-type sensor with a light income display unit, if selection operation of the light income adjustment mode is carried out, since light income level will be made to measure at a time rate with a photo detector shorter than the case of a supervision mode, the light income level of a photo detector can be known for a short time based on many informations. Moreover, when the fire supervision mode is chosen, light income level can be measured at 1 time of a rate at the minimum rate which can detect fire certainly (to i.e., 1 second), and the consumed electric current in case the fire supervision mode is chosen can be stopped low. Thereby, it is also enabled to connect many photoelectrical formula discrete-type sensors with a light income display unit to one supply power.

[0027] The light transmission machine and electric eye of the photoelectrical formula discrete-type sensor given in either of the claims 1-8 with a light income display unit are installed in a height for the photoelectrical formula discrete-type sensor given in a claim 9 with a light income display unit, and the light income display unit is installed in the low place. The vocabulary used here on these specifications and a "low place" are in the status on which scaffolds, such as a stepladder and a ladder, were not reached but the man stood ordinarily also as for \*\*, and easily, it sees by the eye or they mean the usual life space which can work with a finger.

[0028] In this photoelectrical formula discrete-type sensor with a light income display unit In order that a maintenance and a checker may investigate the cause when a trouble and a false report occur in a photoelectrical formula discrete-type sensor since the light income display unit is installed in a low place Since it does not reach purposely to the place in which the sensor is attached but \*\* can also check the light income level of a photo detector in a light income display unit, the trouble of a photoelectrical formula

discrete-type sensor and the cause of a false report can be known easily and easily.

[0029] The photoelectrical formula discrete-type sensor given in a claim 10 with a light income display unit prepared the lid which can be opened and closed by the key in the light income display unit of the photoelectrical formula discrete-type sensor given in either of the claims 1-9 with a light income display unit. Although there is a possibility of saying that common people other than a maintenance, a checker, etc. will touch the switch means established in the light income display unit when a light income display unit is prepared in a low place, since the lid which can be opened and closed is prepared in the light income display unit by the key, with this photoelectrical formula discrete-type sensor with a light income display unit, the common people without the key cannot open a lid. The accident in which common people will touch by this the switch means established in the light income display unit does not arise.

[0030] The photoelectrical formula discrete-type sensor given in a claim 11 with a light income display unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between a light transmission machine and an electric eye by detecting the decrement of the light irradiated from a light emitting device which a photo detector \*\*\*\*s The existence of a fire was distinguished, and the light income display unit on which the \*\*\*\* level of a photo detector is displayed through a signal line at a fire receiver is connected, and it enabled it to check the light income level of a photo detector in a light income display unit further to the photoelectrical formula discrete-type sensor which \*\*\*\*s fire alarm to a fire receiver.

[0031] In this photoelectrical formula discrete-type sensor with a light income display unit, since the light income display unit is prepared in the fire receiver, it does not go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver is installed, for example, as for a maintenance and a checker, \*\* can also check the light income level of a photo detector at a janitor room etc. The photoelectrical formula discrete-type sensor given in a publication's at a claim 12 with a light income display unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the light emitting device which a photo detector \*\*\*\*s is outputted to a fire receiver. by the fire receiver side Based on the light income which the photo detector \*\*\*\*ed, a signal line is photoelectrical formula discrete-type minded [ which is made to \*\*\*\* fire alarm ] further at a fire receiver. The light income display unit on which the \*\*\*\* level of a photo detector is displayed is connected, and it enabled it to check the light income level of a photo detector in a light income display unit.

[0032] Also with this photoelectrical formula discrete-type sensor with a light income display unit, since the light income display unit is prepared in the fire receiver, it does not go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver is installed, for example, as for a maintenance and a checker, \*\* can also check the light income level of a photo detector at a janitor room etc. The photoelectrical formula discrete-type sensor given in a claim 13 with a wave authentication terminal unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between a light transmission machine and an electric eye by detecting the decrement of the light irradiated from a light emitting device which a photo detector \*\*\*\*s The existence of a



fire was distinguished and the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \* ed through the signal line further to the photoelectrical formula discrete-type sensor which \*\*\*\*s fire alarm to a fire receiver was prepared.

[0033] In this photoelectrical formula discrete-type sensor with a wave authentication terminal unit Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the wave authentication terminal unit, a maintenance and a checker The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily only by connecting wave metering devices, such as an oscilloscope, to the wave authentication terminal with which it does not reach to the place in which the sensor is attached, but \*\* was also prepared in the wave authentication terminal unit purposely.

[0034] The photoelectrical formula discrete-type sensor given in a claim 14 with a wave authentication terminal unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the light emitting device which a photo detector \*\*\*\*s is outputted to a fire receiver. by the fire receiver side Based on the light income which the photo detector \*\*\*\*ed, the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income to which the photo detector \*\*\*\*ed fire alarm through the signal line further to the photoelectrical formula discrete-type sensor which is made to \*\*\*\* was prepared.

[0035] Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the wave authentication terminal unit also with this photoelectrical formula discrete-type sensor with a wave authentication terminal unit Wave display, such as an oscilloscope, is only connected to the wave authentication terminal with which a maintenance and a checker are not purposely reached to the place in which the sensor is attached, but \*\* was also prepared in the light income display unit. The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0036] The light transmission machine and electric eye of the photoelectrical formula discrete-type sensor given in the claim 13 or the claim 14 with a wave authentication terminal unit are installed in a height for the photoelectrical formula discrete-type sensor given in a claim 15 with a wave authentication terminal unit, and the wave authentication terminal unit is installed in the low place. In this photoelectrical formula discrete-type sensor with a wave authentication terminal unit In order that a maintenance and a checker may investigate the cause when a trouble and a false report occur in a photoelectrical formula discrete-type sensor since the light income display unit is installed in a low place Since it does not reach purposely to the place in which the sensor is attached but \*\* can also check the light income level of a photo detector in a light income display unit, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0037] The photoelectrical formula discrete-type sensor given in a claim 16 with a wave authentication terminal unit prepared the lid which can be opened and closed by the key in the light income display unit of the photoelectrical formula discrete-type sensor given in either of the claims 13-15 with a wave authentication terminal unit. Although there is a possibility of saying that common people other than a maintenance, a checker, etc.

connect a certain electric product to the wave authentication terminal prepared in the wave authentication terminal unit when a wave authentication terminal unit is prepared in a low place, since the lid which can be opened and closed is prepared in the wave authentication terminal unit by the key, with this photoelectrical formula discrete-type sensor with a wave authentication terminal unit, the common people without the key cannot open a lid. The accident in which common people will connect a certain electric product to the wave authentication terminal prepared in the wave authentication terminal unit by this does not arise.

[0038] The photoelectrical formula discrete-type sensor given in a claim 17 with a wave authentication terminal The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between a light transmission machine and an electric eye by detecting the decrement of the light irradiated from a light emitting device which a photo detector \*\*\*\*\* The existence of a fire was distinguished and the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*\*ed through the signal line further at the fire receiver to the photoelectrical formula discrete-type sensor which \*\*\*\*\*s fire alarm to a fire receiver was prepared.

[0039] In this photoelectrical formula discrete-type sensor with a wave authentication terminal unit Since the wave authentication terminal unit is prepared in the fire receiver, a maintenance and a checker The fire receiver is installed also for \*\* by not going to the site in which the photoelectrical formula discrete-type sensor is installed, for example, at a janitor room etc. only by connecting wave display, such as an oscilloscope, to the wave authentication terminal of a wave authentication terminal unit The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0040] The photoelectrical formula discrete-type sensor given in a claim 18 with a wave authentication terminal The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the light emitting device which a photo detector \*\*\*\*\* is outputted to a fire receiver. by the fire receiver side Based on the light income which the photo detector \*\*\*\*\*ed, the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income to which the photo detector \*\*\*\*\*ed fire alarm through the signal line further to the photoelectrical formula discrete-type sensor which is made to \*\*\*\*\* at the fire receiver was prepared.

[0041] Also with this photoelectrical formula discrete-type sensor with a wave authentication terminal unit, since the wave authentication terminal unit is prepared in the fire receiver, a maintenance and a checker The fire receiver is installed also for \*\* by not going to the site in which the photoelectrical formula discrete-type sensor is installed, for example, at a janitor room etc. only by connecting wave display, such as an oscilloscope, to the wave authentication terminal of a wave authentication terminal unit The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0042]

[Gestalt of implementation of invention] Hereafter, the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention and the

photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention are explained still in detail, referring to a drawing.

(Gestalt 1 of implementation of invention) The gestalt 1 of implementation of invention explains the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention.

[0043] Drawing 1 is the block diagram showing roughly an example of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention. First, as a photoelectrical formula discrete-type sensor, the case where the photoelectrical formula discrete-type sensor for P type is used is made into an example, and it explains. As shown in drawing 1, it dissociates and opposite arrangement of this sensor 1 is carried out so that an optical axis may be in agreement in the light transmission machine 2 which has a light emitting device, and the electric eye 3 which has photo-detector 3a, and it discharges a pulsed light intermittently from the light transmission machine 2, and is made to \*\*\*\* by the electric eye 3. The electric eye 3 is connected to the fire receiver 6 through the signal line W1.

[0044] Although the above configuration is the same as that of the conventional photoelectrical formula discrete-type sensor 101 shown in drawing 11, the light income display unit 11 is newly formed in this sensor 1 through the signal line W2. The light income display unit 11 is formed in the height (low place) suitable for a man working from a floor line.

[0045] In this example, it connects with the output terminal of a microcomputer 4, and the light income of photo-detector 3a digitized by the predetermined art outputs a signal line W2 to the light income display unit 11 with a microcomputer 4. Drawing 2 (a) is the rough block diagram of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention.

[0046] This photoelectrical formula discrete-type sensor 1 with a light income display unit is equipped with the microcomputer 4, and the power and the \*\*\*\* circuit 5 other than photo-detector 3a in an electric eye 3. Threshold Lth is beforehand memorized as \*\*\*\* level of an electric eye 3 by the microcomputer 4. And when \*\*\*\* level L which photo-detector 3a of an electric eye 3 \*\*\*\*ed becomes below the threshold Lth ( $L \leq L_{th}$ ), it judges it as a fire, drives power and the \*\*\*\* circuit 5, and is made to \*\*\*\* fire alarm by the fire receiver 6.

[0047] In addition, the component equipment shown by eight shows the amplifier circuit which amplifies the light income which the photo detector of an electric eye 3 \*\*\*\*ed among drawing 2 (a), and the gain changes this amplifier circuit 8 by light income adjustment means (light income adjustment means 14 shown in drawing 3) to mention later. Next, the configuration of the light income display unit 11 is explained.

[0048] Drawing 3 is the block diagram showing the light income display unit 11 roughly. The light income display unit 11 is equipped with lid 11a which can be opened and closed, and unit mainframe 11b by the key (not shown). In addition, the component the component shown by 11c indicates a keyhole to be by 11d again shows the key component which \*\*\*\*s to keyhole 11c by operation of a key (not shown) among drawing 3.

[0049] Unit mainframe 11b is equipped with the light income level display means 12, the mode change-over switch 13 which switches this photoelectrical formula discrete-type sensor 1a to a fire supervision mode and the light income adjustment mode of a photo

detector, and the light income adjustment means 14. In this example, Light Emitting Diodes 12a, 12b, and 12c of a plurality (this example three pieces) are used as a light income level display means 12.

[0050] the time of the mode change-over switch 13 being set to the fire supervision-mode side, as for two or more Light Emitting Diode 12a, 12b, and 12c -- any -- although -- the light is made not to switch on. In addition, when the mode change-over switch 13 is set to the fire supervision-mode side, a pulsed light is intermittently discharged for the light emitting device of the light transmission machine 2 at 1 time of a rate at 5 seconds, and the photo detector of an electric eye 3 is made to have light income level measured by 5 seconds at 1 time of a rate in this example.

[0051] On the other hand, when the mode change-over switch 13 is set to the light income adjustment mode side of a photo detector, based on the light income of the aforementioned photo detector at the time of the light income adjustment mode being chosen, either of two or more Light Emitting Diode 12a, 12b, and 12c is made to turn on. In this example, Light Emitting Diode 12a is made to turn on, when the light income level of the photo detector of an electric eye 3 runs short.

[0052] Light Emitting Diode 12b is made to turn on when the light income level of the photo detector of an electric eye 3 is proper. Moreover, Light Emitting Diode 12c is made to turn on when the light income level of the photo detector of an electric eye 3 is excessive. If it explains in detail, in this photoelectrical formula discrete-type sensor 1a, two threshold for light income level distinction  $L_{dth}$  and  $L_{bth}$  of a value larger than threshold  $L_{th}$  is beforehand memorized by the microcomputer 4.

[0053] In this sensor 1, if the analog value  $L_a$  of the light income level of the photo detector of an electric eye 3 is between threshold  $L_{dth}$  for light income level distinction, and threshold  $L_{bth}$  for light income level distinction ( $L_{dth} \leq L_a \leq L_{bth}$ ), it will be supposed that the light income level of the photo detector of an electric eye 3 is proper, and only Light Emitting Diode 12b will be made to turn on in this case.

[0054] Moreover, for example, dirt, such as a lens fraction (not shown) of the light transmission machine 2 and a light-transmission aperture (not shown) of an electric eye 3, results, and the light income of photo-detector 3a of an electric eye 3 falls in many years past. And only Light Emitting Diode 12a will be made to turn on if the analog value  $L_a$  of the light income of photo-detector 3a of an electric eye 3 becomes under threshold  $L_{dth}$  for light income level distinction ( $L_a < L_{dth}$ ).

[0055] Moreover, even if the analog value  $L_a$  of the light income of photo-detector 3a of an electric eye 3 is bright, a fire breaks out and smoke flows between the light transmission machine 2 and the electric eye 3 like [ when the spacing between the light transmission machine 2 and the electric eye 3 is short ] Only Light Emitting Diode 12c is made to turn on when the light income level of photo-detector 3a of an electric eye 3 exceeds threshold  $L_{bth}$  for light income level distinction which does not become threshold  $L_{th}$  ( $L_a > L_{bth}$ ).

[0056] In addition, when the mode change-over switch 13 is set to the light income adjustment mode side, a pulsed light is intermittently discharged for the light emitting device of the light transmission machine 2 at 1 time of a rate at 1 second, and photo-detector 3a of an electric eye 3 is made to have light income level measured by 1 second at 1 time of a rate in this example. By furthermore, the thing for which the light income adjustment means 14 is constituted from this sensor 1a by non-phase adjustment

switches, such as a slide formula or a dial formula, and the light income adjustment means 14 is adjusted. If the analog value  $La$  of the light income level of photo-detector 3a of an electric eye 3 becomes between threshold  $Ldth$  for light income level distinction, and threshold  $Lbth$  for light income level distinction ( $Ldth \leq La \leq Lbth$ ) If Light Emitting Diode 12b lights up and the analog value  $La$  of the light income level of the photo detector of an electric eye 3 becomes under threshold  $Ldth$  for light income level distinction ( $La < Ldth$ ) Light Emitting Diode 12c is made to turn on, when Light Emitting Diode 12a is made to turn on and threshold  $Lbth$  for light income level distinction is exceeded ( $La > Lbth$ ).

[0057] Thereby, seeing the lighting status of two or more Light Emitting Diode 12a, 12b, and 12c, if the mode change-over switch 13 is made into a light income adjustment mode side, a maintenance and a checker can only adjust the light income adjustment means 14, and can adjust the light income level of photo-detector 3a of an electric eye 3 to a proper value ( $Ldth \leq La \leq Lbth$ ) so that Light Emitting Diode 12b may light up.

[0058] In addition, in this sensor 1, if the light income adjustment means 14 is adjusted, the gain of the amplifier circuit 8 can be changed. Next, the initial configuration work by which this photoelectrical formula discrete-type sensor 1 with a light income display unit is carried out at the time of construction, and maintenance work are explained.

\*\*\*\*\* business -- first, a predetermined spacing is separated on the head lining and the light transmission machine 2 and the electric eye 3 are attached in it

[0059] Moreover, the light income display unit 11 is attached in the height (low place) suitable for a man working from a floor line. Next, lid 11a of the light income display unit 11 is opened using a key, and the mode change-over switch 13 is set to a light income adjustment mode side. Then, since either of two or more Light Emitting Diode 12a, 12b, and 12c prepared in light income display unit mainframe 11b lit up, after checking that smoke does not intervene between the light transmission machine 2 and the electric eye 3, adjustment operation of the light income adjustment means 14 is carried out, and Light Emitting Diode 12b is made to light up as occasion demands.

[0060] If Light Emitting Diode 12b lights up, the mode change-over switch 13 will be switched to a supervision mode. Then, lid 11a is closed.

When the \*\*\*\* level amendment function is not attached to a sensor 1 below maintenance work After checking that a maintenance and a checker open lid 11a of the light income display unit 11 using a key, and sets the mode change-over switch 13 to a light income adjustment mode side suitably, and smoke does not intervene between the light transmission machine 2 and the electric eye 3 If adjustment operation of the light income adjustment means 14 is carried out, Light Emitting Diode 12b is made to light up and Light Emitting Diode 12b lights up as occasion demands, after switching the mode change-over switch 13 to a supervision mode, check work of closing lid 11a is performed.

[0061] moreover, when \*\*\*\* level zero offset capability is attached to the sensor 1 If the automatic amendment of the \*\*\*\* level becomes impossible as for photoelectrical formula discrete-type sensor 1a, since it will output an alarm, a maintenance and a checker After cleaning photoelectrical formula discrete-type sensor 1a which outputted the alarm, lid 11a of the light income display unit 11 is opened using a key, and the mode change-over switch 13 is set to a light income adjustment mode side. between the light transmission machine 2 and the electric eye 3 If adjustment operation of the light income

adjustment means 14 is carried out, Light Emitting Diode 12b is made to light up and Light Emitting Diode 12b lights up as occasion demands, after checking that smoke does not intervene, after switching the mode change-over switch 13 to a supervision mode, check work of closing lid 11a is performed.

[0062] Next, the case where the photoelectrical formula discrete-type sensor for R forms is used is made into an example, and other examples of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention are explained. Photoelectrical formula discrete-type sensor with light income display unit 1a shown in drawing 2 (b) is the fire receiver 6 connected to sensor 1a, and is made to distinguish a fire. If the following configurations are removed, since this sensor 1a is the same configuration as a sensor 1 in a sensor 1, it gives a corresponding reference mark to corresponding component equipment, and omits the explanation.

[0063] This sensor 1a does not have power and the \*\*\*\* circuit 5 in an electric eye 3. to a microcomputer 4 The threshold Lth which judges whether it is a fire is not memorized, but they are the fire receiver 6 or a repeater (it does not illustrate.) from a microcomputer 4. The analog value which the electric eye 3 \*\*\*\*ed carries out firm output. Threshold Lth is made to memorize beforehand as \*\*\*\* level of an electric eye 3, and when \*\*\*\* level L which the electric eye 3 \*\*\*\*ed becomes below the threshold Lth ( $L \leq Lth$ ), it is made to \*\*\*\* fire alarm with the fire receiver 6 by the fire receiver 6.

[0064] In addition, since initial configuration work and maintenance work of this sensor 1a are the same as that of a sensor 1, an explanation here is omitted. In the photoelectrical formula discrete-type sensors 1 and 1a with a light income display unit Newly form the light income display unit 11, and when needing to be adjusted in connection with the secular change of the photoelectrical formula discrete-type sensors 1 and 1a, in order that a maintenance and a checker may investigate the cause when a trouble and a false report occur in the photoelectrical formula discrete-type sensors 1 and 1a As it does not reach to the place in which sensors 101 and 101a are purposely attached like before but \*\* is also shown in drawing 1, in the status that it stood on the floor By the light income display unit 11 side, since it enabled it to check the light income level of photo-detector 3a, the trouble of the photoelectrical formula discrete-type sensors 1 and 1a and the cause of a false report can be known easily and easily.

[0065] Moreover, the light income adjustment mode and the light income adjustment means 14 are formed in the light income display unit 11. Thereby, in case it adjusts the light income level of photo-detector 3a of the photoelectrical formula discrete-type sensor 1, purposely, like the conventional sensor 101, a maintenance and a checker are not reached to the height in which sensors 101 and 101a are attached, but \*\* is also the light income display unit 11, and it can adjust the light income level of photo-detector 3a easily and easily.

[0066] furthermore, the case where the light income adjustment mode is chosen by the mode change-over switch 13 -- as long as -- any of two or more Light Emitting Diode 12a, 12b, and 12c when either of two or more Light Emitting Diode 12a, 12b, and 12c is made to light up and the fire supervision mode is chosen -- although -- it is made not to switch on the light The consumed electric current in case the fire supervision mode is chosen can be stopped low by this, and it is also enabled to connect many photoelectrical formula discrete-type sensors 1 and 1a with a light income display unit to one supply power.

[0067] Moreover, by the mode change-over switch 13, if selection operation of the light income adjustment mode is carried out It is based on the light income of photo-detector 3a at the time of the light income adjustment mode being chosen. Light Emitting Diode12a turned on when the light income level of photo-detector 3a is insufficient, If either of the Light Emitting Diode12c turned on when Light Emitting Diode12b turned on when the light income level of photo-detector 3a is proper, and the light income level of photo-detector 3a are excessive lights up and the light income adjustment means 14 is adjusted The gain of the amplifier circuit 8 changes and the adjustment status of the light income adjustment means 14 is embraced. Either of the Light Emitting Diode12c turned on when Light Emitting Diode12b turned on when the light income level of Light Emitting Diode12a and photo-detector 3a turned on when the light income level of photo-detector 3a is insufficient is proper, and the light income level of photo-detector 3a are excessive is made to turn on.

[0068] Thereby, seeing the lighting status of these Light Emitting Diodes 12a, 12b, and 12c, if the light income adjustment mode is chosen, a maintenance and a checker are easy operations of adjusting the light income adjustment means 14, and can adjust the light income level of photo-detector 3a of an electric eye 3 to a proper value so that Light Emitting Diode12b turned on when the light income level of photo-detector 3a is proper may light up.

[0069] Moreover, since Light Emitting Diodes 12a, 12b, and 12c are chosen as a display means to display the light income level of photo-detector 3a, in these photoelectrical formula discrete-type sensors 1 and 1a with a light income display unit, the light income level of photo-detector 3a is visually intelligible. And since Light Emitting Diodes 12a, 12b, and 12c are cheap, they can supply the cheap photoelectrical formula discrete-type sensor 1 with a light income display unit to a commercial scene.

(Gestalt 2 of implementation of invention) The gestalt 2 of implementation of invention explains the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention.

[0070] Drawing 4 (a) is the block diagram showing roughly the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention. As shown in drawing 4 (a), it dissociates and opposite arrangement of this sensor 1c is carried out so that an optical axis may be in agreement in the light transmission machine 2 which has a light emitting device, and the electric eye 3 which has photo-detector 3a, and it discharges a pulsed light intermittently from the light transmission machine 2, and is made to \*\*\*\* by the electric eye 3. The electric eye 3 is connected to the fire receiver 6 through the signal line W1.

[0071] The amplifier circuit 8 is connected to photo-detector 3a, and the light income which photo-detector 3a \*\*\*\*ed is amplified by the amplifier circuit 8, and is inputted into a microcomputer 4. Power and the \*\*\*\* circuit 5 are connected to the microcomputer 4. Moreover, threshold Lth is beforehand memorized by the microcomputer 4 as \*\*\*\* level of an electric eye 3. And when \*\*\*\* level L which photo-detector 3a of an electric eye 3 \*\*\*\*ed becomes below the threshold Lth ( $L \leq L_{th}$ ), it judges it as a fire, drives power and the \*\*\*\* circuit 5, and is made to \*\*\*\* fire alarm by the fire receiver 6.

[0072] Although the above configuration is the same as that of the sensor 1 shown in drawing 1 , the wave authentication terminal unit 21 is formed in this sensor 1c through

signal lines W3 and W4. The wave authentication terminal unit 21 is formed in the low place like the light income display unit 11 of the photoelectrical formula discrete-type sensor 1 with a light income display unit. Moreover, the \*\*\*\* level automatic amendment program is memorized, and if the automatic amendment of the \*\*\*\* level becomes impossible as for this sensor 1c, it will output an alarm to a microcomputer 4.

[0073] Next, the configuration of the wave authentication terminal unit 21 is explained. Drawing 5 is the block diagram showing the wave authentication terminal unit 21 roughly. The wave authentication terminal unit 21 is boiled by the key (not shown), and is equipped with lid 21a which can be opened and closed more, and unit mainframe 21b. In addition, the component shown by 21c indicates a keyhole to be by 21d again shows the opening of a key (not shown) among drawing 5.

[0074] The output terminals 22 and 23 for connecting wave metering devices (not shown), such as an oscilloscope, and the terminal for grand line connection 24 are formed in unit mainframe 21b. It connects with the signal line W3 drawn from the output terminal of the amplifier circuit 8, photo-detector 3a \*\*\*\*s an output terminal 22, and the light income of photo-detector 3a amplified by the amplifier circuit 8 outputs it as it is as an analog value.

[0075] Therefore, if wave metering devices (not shown), such as an oscilloscope, are connected to an output terminal 22, the voltage level (wave) of the light income of photo-detector 3a to which the dirt amendment before processing by the \*\*\*\* level automatic amendment program is not carried out can be detected. The digital variable to which the dirt amendment after processing by the \*\*\*\* level [ which it connects with the signal line W4 drawn from the output terminal of a microcomputer 4, and photo-detector 3a \*\*\*\*ed the output terminal 23, was amplified by the amplifier circuit 8, and was memorized by the microcomputer 4 ] automatic-on the other hand amendment program was carried out outputs.

[0076] Therefore, if wave metering devices (not shown), such as an oscilloscope, are connected to an output terminal 23, the amendment light income of photo-detector 3a to which the dirt amendment after processing by the \*\*\*\* level automatic amendment program was carried out can be detected. In addition, in this example, the light income of photo-detector 3a of the electric eye 3 which emitted light to the microcomputer 4 and sampled the light emitting device of a projector 2 every 3 seconds at intervals of 3 seconds as a \*\*\*\* level automatic amendment program to it will be part-accumulated on the 1st, and the program of an amendment is memorized one by one by the zero level in the average.

[0077] Next, the case where the photoelectrical formula discrete-type sensor for R forms is used is made into an example, and other examples of the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention are explained. 1d of the photoelectrical formula discrete-type sensors with a wave authentication terminal unit shown in drawing 4 (b) is the fire receiver 6 connected to 1d of sensors, and they are made to distinguish a fire. If the following configurations are removed, since sensor 1c is the same configuration as sensor 1c, 1d of this sensor gives a corresponding reference mark to corresponding component equipment, and it omits the explanation.

[0078] 1d of this sensor does not have power and the \*\*\*\* circuit 5 in an electric eye 3. to a microcomputer 4 The threshold Lth which judges whether it is a fire is not



memorized, but they are the fire receiver 6 or a repeater (it does not illustrate.) from a microcomputer 4. The analog value which the electric eye 3 \*\*\*\*\* carries out firm output. Threshold  $L_{th}$  is made to memorize beforehand as \*\*\*\*\* level of an electric eye 3, and when \*\*\*\*\* level  $L$  which the electric eye 3 \*\*\*\*\* becomes below the threshold  $L_{th}$  ( $L \leq L_{th}$ ), it is made to \*\*\*\*\* fire alarm with the fire receiver 6 by the fire receiver 6.

[0079] In the photoelectrical formula discrete-type sensors 1c and 1d with a wave authentication terminal unit Since the wave authentication terminals 22 and 23 which detect the voltage variation based on the light income which photo-detector 3a \*\*\*\*\* were formed in the wave authentication terminal unit 21, a maintenance and a checker They are wave display (it does not illustrate.), such as an oscilloscope, to the wave authentication terminals 22 and 23 with which it does not reach to the place in which the sensor 101 is attached, but \*\* was also purposely prepared in the light income display unit 21 like the conventional sensor 101. Only by connecting, the waves with the exact light income of photo-detector 3a (voltage wave etc.) can be known easily and easily.

[0080] When it explains in detail, a maintenance and a checker are wave display (it does not illustrate.), such as an oscilloscope, to the wave authentication terminal 22 and the terminal for grand line connection 24. Purposely the light income of photo-detector 3a which it does not reach to the place in which the sensor 101 is attached, but photo-detector 3a also \*\*\*\*\*s \*\*, and was amplified by the amplifier circuit 8 like the conventional sensor 101 as an analog value Exact waves (voltage wave etc.) can be known easily and easily. Moreover, the amendment light income (digital variable) of photo-detector 3a to which the dirt amendment after processing by the \*\*\*\*\* level automatic amendment program was carried out can be known easily and easily only by connecting wave display (not shown), such as an oscilloscope, to the wave authentication terminal 23 and the terminal for grand line connection 24.

[0081] In addition, although this example explained the example in which the output terminal 22 was connected to the signal line W3 drawn from the output terminal of the amplifier circuit 8, and the output terminal 23 was connected to the signal line W4 drawn from the output terminal of a microcomputer 4 Signal lines W3 and W4 are connected to the output terminal of a microcomputer 4, an analog value may be outputted by the signal line W3, and amendment light income (digital variable) may be made to be outputted from a signal line W4 within a microcomputer 4.

[0082] As mentioned above, with the gestalt 1 of implementation of invention, although the example of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention was explained and the example of the photoelectrical formula discrete-type sensor with a wave authentication terminal unit applied to this invention with the gestalt 2 of implementation of invention was explained, there are various modifications. Photoelectrical formula discrete-type sensor with light income display unit 1e shown in drawing 6 and drawing 7 has formed the light income level display means 12, the mode change-over switch 13, the light income adjustment means 14 and the wave authentication terminals 22 and 23, and the terminal for grand line connection 24 in the light income display unit 31.

[0083] Like photoelectrical formula discrete-type sensor with light income display unit 1e, to the light income display unit 31 The light income level display means 12 and the mode change-over switch 13, When the light income adjustment means 14, the wave authentication terminals 22 and 23, and the terminal for grand line connection 24 are

formed In case a maintenance and a checker adjust the light income level of photo-detector 3a prepared in the electric eye 3 of a photoelectrical formula discrete-type sensor, it is not purposely reached to the place in which the electric eye 3 is attached, but \*\* is also the light income display unit 31. Easily and easily, the light income level of photo-detector 3a can be checked, it can adjust, or the waves with the exact light income of photo-detector 3a (voltage wave etc.) can be further known easily and easily only by connecting wave metering devices, such as an oscilloscope, to the wave authentication terminals 22 and 23.

[0084] Moreover, the photoelectrical formula discrete-type sensors 1f and 1g with a light income display unit shown in each of drawing 8 (a) and drawing 8 (b) show the example which formed the light income display unit 11 in the fire receiver 6. Like the photoelectrical formula discrete-type sensors 1f and 1g with a light income display unit, when the light income display unit 11 is formed in the fire receiver 6, it cannot go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver 6 is installed, for example, the light income level of photo-detector 3a can be checked, or a maintenance and a checker can also adjust \*\* at a janitor room etc.

[0085] Moreover, the photoelectrical formula discrete-type sensors 1h and 1i with a wave authentication terminal unit shown in each of drawing 9 (a) and drawing 9 (b) show the example which formed the wave authentication terminal unit 21 in the fire receiver 6. Like the photoelectrical formula discrete-type sensors 1h and 1i with a wave authentication terminal unit, when the wave authentication terminal unit 21 is formed in the fire receiver 6 A maintenance and a checker do not go to the site in which the projector 2 and the electric eye 3 of a photoelectrical formula discrete-type sensor are installed, but the fire receiver 6 is installed also for \*\*. in a janitor room etc. without moving from its seat The waves with the exact light income of photo-detector 3a (voltage wave etc.) can be known easily and easily only by connecting wave metering devices, such as an oscilloscope, to the wave authentication terminals 22 and 23.

[0086] Furthermore, the photoelectrical formula discrete-type sensors 1j and 1k with a wave authentication terminal unit shown in each of drawing 10 (a) and drawing 10 (b) show again the example which formed the light income display unit 31 in the fire receiver 6. Like the photoelectrical formula discrete-type sensors 1j and 1k with a wave authentication terminal unit, when the light income display unit 31 is formed in the fire receiver 6 A maintenance and a checker do not go to the site in which the photoelectrical formula discrete-type sensors 2 and 3 are installed, but the fire receiver 6 is installed also for \*\*. in a janitor room etc. without moving from its seat The waves with the exact light income of photo-detector 3a (voltage wave etc.) can be known easily and easily only by being able to check or adjust the light income level of photo-detector 3a, and connecting wave metering devices, such as an oscilloscope, to the wave authentication terminals 22 and 23.

[0087] With the gestalt of implementation of this invention, again furthermore, as photoelectrical formula discrete-type sensors 1, 1a, 1e, 1f, 1g, 1j, and 1k with a light income display unit Although the example which formed two or more Light Emitting Diode 12a, 12b, and 12c as a light income level display means 12 of the light income display units 11, 21, and 31 was explained It does not pass over this to have explained the example only desirable, but as long as it excels in visibility, various display meanses can be used for the light income level display means 12, and a level meter, CRT, liquid

crystal, etc. can also be used for it as such a light income level display means 12, for example. And if two or more Light Emitting Diodes, level meters, CRT, liquid crystal, etc. are used as a light income level display means 12 to display the light income level of photo-detector 3a, the variation of goods can be extended and, thereby, the goods which suited the needs of the diversified customer can be supplied to a commercial scene.

[0088]

[Effect of the invention] As mentioned above, in order that a maintenance and a checker may investigate the cause when a photoelectrical formula discrete-type sensor is constructed, or when trouble occurrence is carried out since the light income display unit is newly prepared in claims 1 and 2 with the photoelectrical formula discrete-type sensor with a light income display unit of a publication as explained in detail, it does not reach purposely to the place in which the sensor is attached, but \*\* can also check the light income level of a photo detector in a light income display unit. Therefore, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0089] In the photoelectrical formula discrete-type sensor given in a claim 3 with a light income display unit, the light income adjustment mode and the light income adjustment means are prepared in the light income display unit. Therefore, in case it adjusts the light income level of the photo detector of a photoelectrical formula discrete-type sensor, a maintenance and a checker are not purposely reached to the place in which the sensor is attached, but \*\* is also a light income display unit and it can adjust the light income level of a photo detector for it easily and easily.

[0090] Since a display means can be variously used for a claim 4 as a light income level display means in the photoelectrical formula discrete-type sensor with a light income display unit of a publication, by using two or more lamps, level meters, CRT, liquid crystal, etc. as a light income \*\*\*\* display means to display the light income level of a photo detector, the variation of goods can be extended and, thereby, the goods which suited the needs of the diversified customer can be supplied to a commercial scene.

[0091] the case where the light income adjustment mode is chosen as a claim 5 in the photoelectrical formula discrete-type sensor with a light income display unit of a publication -- as long as -- any of two or more lamps when either of two or more lamps is made to light up and the fire supervision mode is chosen -- although -- it is made not to switch on the light The consumed electric current in case the fire supervision mode is chosen can be stopped low by this, and it is also enabled to connect many photoelectrical formula discrete-type sensors with a light income display unit to one supply power.

[0092] Moreover, since the lamp is chosen as a display means to display the light income level of a photo detector, in this photoelectrical formula discrete-type sensor with a light income display unit, the light income level of a photo detector is visually intelligible. Since it is cheap when choosing especially Light Emitting Diode, the cheap photoelectrical formula discrete-type sensor with a light income display unit can be supplied to a commercial scene.

[0093] In the photoelectrical formula discrete-type sensor given in a claim 6 with a light income display unit, since a maintenance and a checker can adjust a light income adjustment means, seeing the lighting status of these lamps so that the lamp turned on when the light income level of a photo detector is proper may light up if the light income adjustment mode is chosen, it can adjust easily for a proper value, and easily the light

income level of the photo detector of an electric eye.

[0094] In the photoelectrical formula discrete-type sensor with a light income display unit of a publication, to a claim 7 Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the light income display unit, a maintenance and a checker The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily only by connecting wave display, such as an oscilloscope, to the wave authentication terminal with which it does not reach to the place in which the sensor is attached, but \*\* was also prepared in the light income display unit purposely.

[0095] In the photoelectrical formula discrete-type sensor given in a claim 8 with a light income display unit, since the twist has also set up comparatively the time rate to instrumentation of the light income level of the photo detector in the light income adjustment mode short the time to instrumentation of the light income level of the photo detector in a fire supervision mode, in the light income adjustment mode, the light income level of a photo detector can be known rather than a fire supervision mode for a short time based on many informations.

[0096] Moreover, if light income level measures at minimum rate which can detect a fire certainly when the fire supervision mode is chosen, the consumed electric current can be stopped low. Thereby, it is also enabled to connect many photoelectrical formula discrete-type sensors with a light income display unit to one supply power. In the photoelectrical formula discrete-type sensor with a light income display unit of a publication, to a claim 9 In order that a maintenance and a checker may investigate the cause when a trouble occurs, the time of construction of a photoelectrical formula discrete-type sensor, and since the light income display unit is installed in a low place Since it does not reach purposely to the place in which the sensor is attached but \*\* can also check the light income level of a photo detector in a light income display unit, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0097] In the photoelectrical formula discrete-type sensor given in a claim 10 with a light income display unit, since the lid which can be opened and closed is prepared by the key at the light income display unit, the common people without the key cannot open a lid. The accident in which common people will touch by this the switch means established in the light income display unit does not arise.

[0098] In the photoelectrical formula discrete-type sensor given in a claim 11 with a light income display unit, since the light income display unit is prepared in the fire receiver, it does not go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver is installed, for example, as for a maintenance and a checker, \*\* can also check the light income level of a photo detector at a janitor room etc. Also with the photoelectrical formula discrete-type sensor given in a claim 12 with a light income display unit, since the light income display unit is prepared in the fire receiver, it does not go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver is installed, for example, as for a maintenance and a checker, \*\* can also check the light income level of a photo detector at a janitor room etc.

[0099] In the photoelectrical formula discrete-type sensor with a wave authentication terminal unit of a publication, to a claim 13 Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed

was prepared in the wave authentication terminal unit, a maintenance and a checker The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily only by connecting wave metering devices, such as an oscilloscope, to the wave authentication terminal with which it does not reach to the place in which the sensor is attached, but \*\* was also prepared in the wave authentication terminal unit purposely.

[0100] Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the wave authentication terminal unit also with the photoelectrical formula discrete-type sensor given in a claim 14 with a wave authentication terminal unit Wave display, such as an oscilloscope, is only connected to the wave authentication terminal with which a maintenance and a checker are not purposely reached to the place in which the sensor is attached, but \*\* was also prepared in the light income display unit. The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0101] In the photoelectrical formula discrete-type sensor with a wave authentication terminal unit of a publication, to a claim 15 In order that a maintenance and a checker may investigate the cause when the time of construction of a photoelectrical formula discrete-type sensor and a trouble occur since the light income display unit is installed in a low place Since it does not reach purposely to the place in which the sensor is attached but \*\* can also check the light income level of a photo detector in a light income display unit, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0102] In the photoelectrical formula discrete-type sensor given in a claim 16 with a wave authentication terminal unit, since the lid which can be opened and closed is prepared by the key at the wave authentication terminal unit, the common people without the key cannot open a lid. The accident in which common people will connect a certain electric product to the wave authentication terminal prepared in the wave authentication terminal unit by this does not arise.

[0103] In the photoelectrical formula discrete-type sensor with a wave authentication terminal unit of a publication, to a claim 17 Since the wave authentication terminal unit is prepared in the fire receiver, a maintenance and a checker The fire receiver is installed also for \*\* by not going to the site in which the photoelectrical formula discrete-type sensor is installed, for example, at a janitor room etc. only by connecting wave display, such as an oscilloscope, to the wave authentication terminal of a wave authentication terminal unit The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0104] Also with the photoelectrical formula discrete-type sensor given in a claim 18 with a wave authentication terminal unit, since the wave authentication terminal unit is prepared in the fire receiver, a maintenance and a checker The fire receiver is installed also for \*\* by not going to the site in which the photoelectrical formula discrete-type sensor is installed, for example, at a janitor room etc. only by connecting wave display, such as an oscilloscope, to the wave authentication terminal of a wave authentication terminal unit The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

TECHNICAL FIELD

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[The technical field to which invention belongs] this invention relates to the photoelectrical formula discrete-type sensor with a light income display unit and the photoelectrical formula discrete-type sensor with a wave authentication terminal unit with which a maintenance and a checker do not reach the heights in which the photoelectrical formula discrete-type sensor is attached, such as head lining, but \*\* also enabled it to investigate causes, such as the trouble, simply, when the time of construction of a photoelectrical formula discrete-type sensor, a trouble, etc. occur about a photoelectrical formula discrete-type sensor.

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#### PRIOR ART

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[Prior art] Recently, the photoelectrical formula discrete-type sensor is installed in buildings, such as an apartment house and a building. Drawing 11 is the block diagram showing the conventional photoelectrical formula discrete-type sensor roughly. As shown in drawing 11, it dissociates and opposite arrangement of the photoelectrical formula discrete-type sensor 101 is carried out so that an optical axis may be in agreement in the light transmission machine 102 which has a light emitting device, and the electric eye 103 which has a photo detector, and it discharges a pulsed light intermittently from the light transmission machine 102, and is made to \*\*\*\* by the electric eye 103. The electric eye 103 is connected to the fire receiver 106 through the signal line W101.

[0003] The photoelectrical formula discrete-type sensor 101 distinguishes the existence of a fire using the principle that the \*\*\*\* level which \*\*\*\*s by the electric eye 103 declines, by the smoke which flowed between the light transmission machine 102 and the electric eye 103, when a fire breaks out. The photoelectrical formula discrete-type sensor 101 shown in drawing 12 (a) is electric-eye 103 the very thing, and shows the photoelectrical formula discrete-type sensor for P type which was made to distinguish the fire.

[0004] Moreover, photoelectrical formula discrete-type sensor 101a shown in drawing 12 (b) is the fire receiver 106 connected to sensor 101a, and shows the photoelectrical formula discrete-type sensor for R forms which was made to distinguish the fire. The photoelectrical formula discrete-type sensor 101 for P type is a microcomputer (generally) in an electric eye 103. The thing 104 dedicated in 1 board as an object for device nests called a microcomputer not only including CPU function but including circumference chips, such as memory and an interface circuitry Have power and the \*\*\*\* circuit 105 and threshold Lth is beforehand stored in a microcomputer 104 as \*\*\*\* level of an electric eye 103. When \*\*\*\* level L which the electric eye 103 \*\*\*\*ed becomes below the threshold Lth ( $L \leq L_{th}$ ), it judges it as a fire, drives power and the \*\*\*\* circuit 105, and is made to \*\*\*\* fire alarm by the fire receiver 106.

[0005] moreover, in another photoelectrical formula discrete-type sensor 101a for R forms The microcomputer 104 is built in in the electric eye 103, and they are the fire receiver 106 or a repeater (it does not illustrate.) from a microcomputer 104. Firm output of the analog value which the electric eye 103 \*\*\*\*ed is carried out. to the fire receiver

106 Threshold Lth is made to memorize beforehand as \*\*\*\* level of an electric eye 103, and when \*\*\*\* level L which the electric eye 103 \*\*\*\*ed becomes below the threshold Lth ( $L \leq L_{th}$ ), it is made to \*\*\*\* fire alarm with the fire receiver 106.

[0006] In addition, the component equipment shown by 108 shows the amplifier circuit which amplifies the light income which photo-detector 103a of an electric eye 103 \*\*\*\*ed among drawing 12 (a) and drawing 12 (b). Since there are secular change that that dust adheres etc. results and the photographic sensitivity of an electric eye 103 changes after the conventional photoelectrical formula discrete-type sensors 101 and 101a attach the photoelectrical formula discrete-type sensors 101 and 101a in head lining etc., a maintenance and a checker need to perform depuration, check, and adjustment of the photoelectrical formula discrete-type sensors 101 and 101a suitably.

[0007] Moreover, since an alarm will be outputted if an automatic amendment becomes impossible for \*\*\*\* level if it is in some to which \*\*\*\* level zero offset capability is attached, a maintenance and a checker are performing check and adjustment, after cleaning the photoelectrical formula discrete-type sensors 101 and 101a which outputted the alarm.

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## EFFECT OF THE INVENTION

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[Effect of the invention] As mentioned above, in order that a maintenance and a checker may investigate the cause when a photoelectrical formula discrete-type sensor is constructed, or when trouble occurrence is carried out since the light income display unit is newly prepared in claims 1 and 2 with the photoelectrical formula discrete-type sensor with a light income display unit of a publication as explained in detail, it does not reach purposely to the place in which the sensor is attached, but \*\* can also check the light income level of a photo detector in a light income display unit. Therefore, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0089] In the photoelectrical formula discrete-type sensor given in a claim 3 with a light income display unit, the light income adjustment mode and the light income adjustment means are prepared in the light income display unit. Therefore, in case it adjusts the light income level of the photo detector of a photoelectrical formula discrete-type sensor, a maintenance and a checker are not purposely reached to the place in which the sensor is attached, but \*\* is also a light income display unit and it can adjust the light income level of a photo detector for it easily and easily.

[0090] Since a display means can be variously used for a claim 4 as a light income level display means in the photoelectrical formula discrete-type sensor with a light income display unit of a publication, by using two or more lamps, level meters, CRT, liquid crystal, etc. as a light income \*\*\*\* display means to display the light income level of a photo detector, the variation of goods can be extended and, thereby, the goods which suited the needs of the diversified customer can be supplied to a commercial scene.

[0091] the case where the light income adjustment mode is chosen as a claim 5 in the photoelectrical formula discrete-type sensor with a light income display unit of a publication -- as long as -- any of two or more lamps when either of two or more lamps is

made to light up and the fire supervision mode is chosen -- although -- it is made not to switch on the light The consumed electric current in case the fire supervision mode is chosen can be stopped low by this, and it is also enabled to connect many photoelectrical formula discrete-type sensors with a light income display unit to one supply power.

[0092] Moreover, since the lamp is chosen as a display means to display the light income level of a photo detector, in this photoelectrical formula discrete-type sensor with a light income display unit, the light income level of a photo detector is visually intelligible.

Since it is cheap when choosing especially Light Emitting Diode, the cheap photoelectrical formula discrete-type sensor with a light income display unit can be supplied to a commercial scene.

[0093] In the photoelectrical formula discrete-type sensor given in a claim 6 with a light income display unit, since a maintenance and a checker can adjust a light income adjustment means, seeing the lighting status of these lamps so that the lamp turned on when the light income level of a photo detector is proper may light up if the light income adjustment mode is chosen, it can adjust easily for a proper value, and easily the light income level of the photo detector of an electric eye.

[0094] In the photoelectrical formula discrete-type sensor with a light income display unit of a publication, to a claim 7 Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the light income display unit, a maintenance and a checker The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily only by connecting wave display, such as an oscilloscope, to the wave authentication terminal with which it does not reach to the place in which the sensor is attached, but \*\* was also prepared in the light income display unit purposely.

[0095] In the photoelectrical formula discrete-type sensor given in a claim 8 with a light income display unit, since the twist has also set up comparatively the time rate to instrumentation of the light income level of the photo detector in the light income adjustment mode short the time to instrumentation of the light income level of the photo detector in a fire supervision mode, in the light income adjustment mode, the light income level of a photo detector can be known rather than a fire supervision mode for a short time based on many informations.

[0096] Moreover, if light income level measures at minimum rate which can detect a fire certainly when the fire supervision mode is chosen, the consumed electric current can be stopped low. Thereby, it is also enabled to connect many photoelectrical formula discrete-type sensors with a light income display unit to one supply power. In the photoelectrical formula discrete-type sensor with a light income display unit of a publication, to a claim 9 In order that a maintenance and a checker may investigate the cause when a trouble occurs, the time of construction of a photoelectrical formula discrete-type sensor, and since the light income display unit is installed in a low place Since it does not reach purposely to the place in which the sensor is attached but \*\* can also check the light income level of a photo detector in a light income display unit, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0097] In the photoelectrical formula discrete-type sensor given in a claim 10 with a light income display unit, since the lid which can be opened and closed is prepared by the key at the light income display unit, the common people without the key cannot open a lid.



The accident in which common people will touch by this the switch means established in the light income display unit does not arise.

[0098] In the photoelectrical formula discrete-type sensor given in a claim 11 with a light income display unit, since the light income display unit is prepared in the fire receiver, it does not go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver is installed, for example, as for a maintenance and a checker, \*\* can also check the light income level of a photo detector at a janitor room etc. Also with the photoelectrical formula discrete-type sensor given in a claim 12 with a light income display unit, since the light income display unit is prepared in the fire receiver, it does not go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver is installed, for example, as for a maintenance and a checker, \*\* can also check the light income level of a photo detector at a janitor room etc.

[0099] In the photoelectrical formula discrete-type sensor with a wave authentication terminal unit of a publication, to a claim 13 Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the wave authentication terminal unit, a maintenance and a checker The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily only by connecting wave metering devices, such as an oscilloscope, to the wave authentication terminal with which it does not reach to the place in which the sensor is attached, but \*\* was also prepared in the wave authentication terminal unit purposely.

[0100] Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the wave authentication terminal unit also with the photoelectrical formula discrete-type sensor given in a claim 14 with a wave authentication terminal unit Wave display, such as an oscilloscope, is only connected to the wave authentication terminal with which a maintenance and a checker are not purposely reached to the place in which the sensor is attached, but \*\* was also prepared in the light income display unit. The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0101] In the photoelectrical formula discrete-type sensor with a wave authentication terminal unit of a publication, to a claim 15 In order that a maintenance and a checker may investigate the cause when the time of construction of a photoelectrical formula discrete-type sensor and a trouble occur since the light income display unit is installed in a low place Since it does not reach purposely to the place in which the sensor is attached but \*\* can also check the light income level of a photo detector in a light income display unit, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0102] In the photoelectrical formula discrete-type sensor given in a claim 16 with a wave authentication terminal unit, since the lid which can be opened and closed is prepared by the key at the wave authentication terminal unit, the common people without the key cannot open a lid. The accident in which common people will connect a certain electric product to the wave authentication terminal prepared in the wave authentication terminal unit by this does not arise.

[0103] In the photoelectrical formula discrete-type sensor with a wave authentication terminal unit of a publication, to a claim 17 Since the wave authentication terminal unit is prepared in the fire receiver, a maintenance and a checker The fire receiver is installed

also for \*\* by not going to the site in which the photoelectrical formula discrete-type sensor is installed, for example, at a janitor room etc. only by connecting wave display, such as an oscilloscope, to the wave authentication terminal of a wave authentication terminal unit The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0104] Also with the photoelectrical formula discrete-type sensor given in a claim 18 with a wave authentication terminal unit, since the wave authentication terminal unit is prepared in the fire receiver, a maintenance and a checker The fire receiver is installed also for \*\* by not going to the site in which the photoelectrical formula discrete-type sensor is installed, for example, at a janitor room etc. only by connecting wave display, such as an oscilloscope, to the wave authentication terminal of a wave authentication terminal unit The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

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#### TECHNICAL PROBLEM

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[Object of the Invention] By the way, when the adjustment, the trouble, and false report accompanied by secular change occur in the conventional photoelectrical formula discrete-type sensors 101 and 101a, in order to find the cause, the light income adjustment change-over switch (light income adjustment change-over switch 111 shown in drawing 11 ) is prepared in the side face of an electric eye 103, the light income adjustment change-over switch 111 is switched, and the light income of an electric eye 103 is insufficient, or is carrying out proper or excessive authentication.

[0009] Moreover, it is drawn from the output terminal of the amplifier circuit 108 by the side face of an electric eye 103. The output terminal for detecting the voltage level (wave) outputted from the amplifier circuit 108 (it does not illustrate.) It prepares and is an output terminal (it does not illustrate.). Wave metering devices, such as an oscilloscope (it does not illustrate.) If it connects, there is also a thing which enables it to investigate whether the \*\*\*\* level of photo-detector 103a which photo-detector 103a of an electric eye 103 \*\*\*\*ed, and was amplified with the wave metering device in the amplifier circuit 108 is proper.

[0010] However, since the electric eye 103 is generally attached in heights, such as head lining of a building When the adjustment and the trouble accompanied by the time of construction of the photoelectrical formula discrete-type sensors 101 and 101a or secular change occur Since the photoelectrical formula discrete-type sensors 101 and 101a are attached in heights, such as head lining, a maintenance and a checker As shown in drawing 11 , in order to investigate adjustment of the photoelectrical formula discrete-type sensors 101 and 101a, a trouble, and the cause of a false report Moreover, scaffolds, such as a stepladder and a ladder, were needed, it reached on the stepladder or the ladder, and it is in the bad status of such a scaffold, and there was a problem that maintenance / check work had to be performed.

[0011] When it is made in order that this invention may solve the above problems, and constructing a photoelectrical formula discrete-type sensor, when a trouble occurs, a maintenance and a checker Without reaching a stepladder, a ladder, etc., it is a low place and the light income of an electric eye 103 can check whether it is proper easily and

easily. further It aims at offering the photoelectrical formula discrete-type sensor with a light income display unit and the photoelectrical formula discrete-type sensor with a wave authentication terminal unit which enabled it to correct the light income of an electric eye 103 to a proper value easily and simply in a low place.

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## MEANS

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[The means for solving a technical problem] The photoelectrical formula discrete-type sensor given in a claim 1 with a light income display unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between a light transmission machine and an electric eye by detecting the decrement of the light irradiated from a light emitting device which a photo detector \*\*\*\*s The existence of a fire was distinguished, and the light income display unit on which an electric eye is made to display the \*\*\*\* level of a photo detector through a signal line is connected, and it enabled it to check the light income level of a photo detector in a light income display unit further to the photoelectrical formula discrete-type sensor which \*\*\*\*s fire alarm to a fire receiver.

[0013] In this photoelectrical formula discrete-type sensor with a light income display unit, since it does not reach purposely to the place in which the sensor is attached but \*\* also enabled it to check the light income level of a photo detector in a light income display unit when a light income display unit is newly prepared and a trouble and a false report occur in a photoelectrical formula discrete-type sensor in order that a maintenance and a checker might investigate the cause, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0014] The photoelectrical formula discrete-type sensor given in a claim 2 with a light income display unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the light emitting device which a photo detector \*\*\*\*s is outputted to a fire receiver. by the fire receiver side Based on the light income which the photo detector \*\*\*\*ed, the light income display unit on which the \*\*\*\* level of a photo detector is displayed through a signal line is further connected to the photoelectrical formula discrete-type sensor which is made to \*\*\*\* fire alarm. in a light income display unit It enabled it to check the light income level of a photo detector.

[0015] Since it does not reach purposely to the place in which the sensor is attached but \*\* also enables it to check the light income level of a photo detector in a light income display unit when a light income display unit is newly prepared and a trouble and a false report occur in a photoelectrical formula discrete-type sensor also with this photoelectrical formula discrete-type sensor with a light income display unit in order that a maintenance and a checker may investigate the cause, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0016] The photoelectrical formula discrete-type sensor given in a claim 3 with a light income display unit The light income display unit of the photoelectrical formula discrete-type sensor given in the claim 1 or the claim 2 with a light income display unit If it has a fire supervision mode, the light income adjustment mode of a photo detector, the light

income level display means of the light income of a photo detector, and a light income adjustment means to adjust the light income of a photo detector and selection operation of the light income adjustment mode of a photo detector is carried out So that the light income of the photo detector as which the light income of the photo detector at the time of the light income adjustment mode being chosen is displayed on a light income level display means, and is displayed on the light income level display means may become a proper value If a light income adjustment means is adjusted, the light income of a photo detector will be made to become proper.

[0017] In this photoelectrical formula discrete-type sensor with a light income display unit, since the light income adjustment mode and the light income adjustment means are prepared in the light income display unit, in case the light income level of the photo detector of a photoelectrical formula discrete-type sensor is adjusted, a maintenance and a checker are not purposely reached to the place in which the sensor is attached, but \*\* is also a light income display unit and it can adjust the light income level of a photo detector for it easily and easily.

[0018] The photoelectrical formula discrete-type sensor given in a claim 4 with a light income display unit is either of the display meanses, such as a lamp of pluralities [ means / light income level display / of the photoelectrical formula discrete-type sensor given in a claim 3 with a light income display unit ], such as Light Emitting Diode, a level meter, CRT, and liquid crystal. Anything can be used if it is the display means for which a maintenance and a checker understand the light income level of a photo detector easily as a light income display unit.

[0019] Therefore, by using two or more lamps, level meters, CRT, liquid crystal, etc. as a light income level display means to display the light income level of a photo detector, the variation of goods can be extended and, thereby, the goods which suited the needs of the diversified customer can be supplied now to a commercial scene. The photoelectrical formula discrete-type sensor given in a claim 5 with a light income display unit is equipped with the lamp turned on when the light income level of a photo detector runs short of the light income level display meanses of a light income display unit of the photoelectrical formula discrete-type sensor given in a claim 3 with a light income display unit, the lamp turned on when the light income level of a photo detector is proper, and the lamp turned on when the light income level of a photo detector is excessive.

[0020] the case where the light income adjustment mode is chosen in this photoelectrical formula discrete-type sensor with a light income display unit -- as long as -- any of two or more lamps when either of two or more lamps is made to light up and the fire supervision mode is chosen -- although -- it is made not to switch on the light The consumed electric current in case the fire supervision mode is chosen can be stopped low by this, and it is also enabled to connect many photoelectrical formula discrete-type sensors with a light income display unit to one supply power.

[0021] Moreover, since the lamp is chosen as a display means to display the light income level of a photo detector, in this photoelectrical formula discrete-type sensor with a light income display unit, the light income level of a photo detector is visually intelligible. And since the lamp is cheap if Light Emitting Diode is used, it can supply the cheap photoelectrical formula discrete-type sensor with a light income display unit to a commercial scene.

[0022] The photoelectrical formula discrete-type sensor given in a claim 6 with a light

income display unit If selection operation of the light income adjustment mode of a photo detector of the photoelectrical formula discrete-type sensor given in a claim 5 with a light income display unit is carried out It is based on the light income of the photo detector at the time of the light income adjustment mode being chosen. the lamp turned on when the lamp and the light income level of a photo detector which are turned on when the light income level of a photo detector is insufficient are proper -- and Either of the lamps turned on when the light income level of a photo detector is excessive lights up, and either of these lamps is made to turn on by adjusting a light income adjustment means.

[0023] Thereby, seeing the lighting status of these lamps, if the light income adjustment mode is chosen, a maintenance and a checker are easy operations of adjusting a light income adjustment means, and can adjust the light income level of the photo detector of an electric eye to a proper value so that the lamp turned on when the light income level of a photo detector is proper may light up. The photoelectrical formula discrete-type sensor given in a claim 7 with a light income display unit prepared the wave authentication terminal which detects further the voltage variation based on the light income which the photo detector \*\*\*\*ed in the light income display unit of the photoelectrical formula discrete-type sensor given in either of the claims 1-6 with a light income display unit.

[0024] In this photoelectrical formula discrete-type sensor with a light income display unit Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the light income display unit, a maintenance and a checker The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily only by connecting wave display, such as an oscilloscope, to the wave authentication terminal with which it does not reach to the place in which the sensor is attached, but \*\* was also prepared in the light income display unit purposely.

[0025] The photoelectrical formula discrete-type sensor with a light income display unit of a publication is set as the claim 8 in the photoelectrical formula discrete-type sensor given in either of the claims 3-7 with a light income display unit shorter than the time rate of instrumentation of in a fire supervision mode in the time rate of the instrumentation of light income level in the light income adjustment mode of a photo detector of light income level. A photo detector is measured in a desirable example, light income level is measured at 1 time of a rate at 1 second, and a photo detector has light income level measured by 5 seconds at 1 time of a rate in the light income adjustment mode at a fire supervision mode.

[0026] In this photoelectrical formula discrete-type sensor with a light income display unit, if selection operation of the light income adjustment mode is carried out, since light income level will be made to measure at a time rate with a photo detector shorter than the case of a supervision mode, the light income level of a photo detector can be known for a short time based on many informations. Moreover, when the fire supervision mode is chosen, light income level can be measured at 1 time of a rate at the minimum rate which can detect fire certainly (to i.e., 1 second), and the consumed electric current in case the fire supervision mode is chosen can be stopped low. Thereby, it is also enabled to connect many photoelectrical formula discrete-type sensors with a light income display unit to one supply power.

[0027] The light transmission machine and electric eye of the photoelectrical formula discrete-type sensor given in either of the claims 1-8 with a light income display unit are

installed in a height for the photoelectrical formula discrete-type sensor given in a claim 9 with a light income display unit, and the light income display unit is installed in the low place. The vocabulary used here on these specifications and a "low place" are in the status on which scaffolds, such as a stepladder and a ladder, were not reached but the man stood ordinarily also as for \*\*, and easily, it sees by the eye or they mean the usual life space which can work with a finger.

[0028] In this photoelectrical formula discrete-type sensor with a light income display unit In order that a maintenance and a checker may investigate the cause when a trouble and a false report occur in a photoelectrical formula discrete-type sensor since the light income display unit is installed in a low place Since it does not reach purposely to the place in which the sensor is attached but \*\* can also check the light income level of a photo detector in a light income display unit, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0029] The photoelectrical formula discrete-type sensor given in a claim 10 with a light income display unit prepared the lid which can be opened and closed by the key in the light income display unit of the photoelectrical formula discrete-type sensor given in either of the claims 1-9 with a light income display unit. Although there is a possibility of saying that common people other than a maintenance, a checker, etc. will touch the switch means established in the light income display unit when a light income display unit is prepared in a low place, since the lid which can be opened and closed is prepared in the light income display unit by the key, with this photoelectrical formula discrete-type sensor with a light income display unit, the common people without the key cannot open a lid. The accident in which common people will touch by this the switch means established in the light income display unit does not arise.

[0030] The photoelectrical formula discrete-type sensor given in a claim 11 with a light income display unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between a light transmission machine and an electric eye by detecting the decrement of the light irradiated from a light emitting device which a photo detector \*\*\*\*s The existence of a fire was distinguished, and the light income display unit on which the \*\*\*\* level of a photo detector is displayed through a signal line at a fire receiver is connected, and it enabled it to check the light income level of a photo detector in a light income display unit further to the photoelectrical formula discrete-type sensor which \*\*\*\*s fire alarm to a fire receiver.

[0031] In this photoelectrical formula discrete-type sensor with a light income display unit, since the light income display unit is prepared in the fire receiver, it does not go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver is installed, for example, as for a maintenance and a checker, \*\* can also check the light income level of a photo detector at a janitor room etc. The photoelectrical formula discrete-type sensor given in a publication's at a claim 12 with a light income display unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the light emitting device which a photo detector \*\*\*\*s is outputted to a fire receiver. by the fire receiver side Based on the light income which the photo detector \*\*\*\*ed, a signal line is photoelectrical formula discrete-type minded [ which is made to \*\*\* fire alarm ] further at a fire receiver. The light income display unit

on which the \*\*\*\* level of a photo detector is displayed is connected, and it enabled it to check the light income level of a photo detector in a light income display unit.

[0032] Also with this photoelectrical formula discrete-type sensor with a light income display unit, since the light income display unit is prepared in the fire receiver, it does not go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver is installed, for example, as for a maintenance and a checker, \*\* can also check the light income level of a photo detector at a janitor room etc. The photoelectrical formula discrete-type sensor given in a claim 13 with a wave authentication terminal unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between a light transmission machine and an electric eye by detecting the decrement of the light irradiated from a light emitting device which a photo detector \*\*\*\*s The existence of a fire was distinguished and the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed through the signal line further to the photoelectrical formula discrete-type sensor which \*\*\*\*s fire alarm to a fire receiver was prepared.

[0033] In this photoelectrical formula discrete-type sensor with a wave authentication terminal unit Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the wave authentication terminal unit, a maintenance and a checker The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily only by connecting wave metering devices, such as an oscilloscope, to the wave authentication terminal with which it does not reach to the place in which the sensor is attached, but \*\* was also prepared in the wave authentication terminal unit purposely.

[0034] The photoelectrical formula discrete-type sensor given in a claim 14 with a wave authentication terminal unit The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the light emitting device which a photo detector \*\*\*\*s is outputted to a fire receiver. by the fire receiver side Based on the light income which the photo detector \*\*\*\*ed, the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income to which the photo detector \*\*\*\*ed fire alarm through the signal line further to the photoelectrical formula discrete-type sensor which is made to \*\*\*\* was prepared.

[0035] Since the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed was prepared in the wave authentication terminal unit also with this photoelectrical formula discrete-type sensor with a wave authentication terminal unit Wave display, such as an oscilloscope, is only connected to the wave authentication terminal with which a maintenance and a checker are not purposely reached to the place in which the sensor is attached, but \*\* was also prepared in the light income display unit. The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0036] The light transmission machine and electric eye of the photoelectrical formula discrete-type sensor given in the claim 13 or the claim 14 with a wave authentication terminal unit are installed in a height for the photoelectrical formula discrete-type sensor given in a claim 15 with a wave authentication terminal unit, and the wave authentication terminal unit is installed in the low place. In this photoelectrical formula discrete-type

sensor with a wave authentication terminal unit In order that a maintenance and a checker may investigate the cause when a trouble and a false report occur in a photoelectrical formula discrete-type sensor since the light income display unit is installed in a low place Since it does not reach purposely to the place in which the sensor is attached but \*\* can also check the light income level of a photo detector in a light income display unit, the trouble of a photoelectrical formula discrete-type sensor and the cause of a false report can be known easily and easily.

[0037] The photoelectrical formula discrete-type sensor given in a claim 16 with a wave authentication terminal unit prepared the lid which can be opened and closed by the key in the light income display unit of the photoelectrical formula discrete-type sensor given in either of the claims 13-15 with a wave authentication terminal unit. Although there is a possibility of saying that common people other than a maintenance, a checker, etc. connect a certain electric product to the wave authentication terminal prepared in the wave authentication terminal unit when a wave authentication terminal unit is prepared in a low place, since the lid which can be opened and closed is prepared in the wave authentication terminal unit by the key, with this photoelectrical formula discrete-type sensor with a wave authentication terminal unit, the common people without the key cannot open a lid. The accident in which common people will connect a certain electric product to the wave authentication terminal prepared in the wave authentication terminal unit by this does not arise.

[0038] The photoelectrical formula discrete-type sensor given in a claim 17 with a wave authentication terminal The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between a light transmission machine and an electric eye by detecting the decrement of the light irradiated from a light emitting device which a photo detector \*\*\*\*s The existence of a fire was distinguished and the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income which the photo detector \*\*\*\*ed through the signal line further at the fire receiver to the photoelectrical formula discrete-type sensor which \*\*\*\*s fire alarm to a fire receiver was prepared.

[0039] In this photoelectrical formula discrete-type sensor with a wave authentication terminal unit Since the wave authentication terminal unit is prepared in the fire receiver, a maintenance and a checker The fire receiver is installed also for \*\* by not going to the site in which the photoelectrical formula discrete-type sensor is installed, for example, at a janitor room etc. only by connecting wave display, such as an oscilloscope, to the wave authentication terminal of a wave authentication terminal unit The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0040] The photoelectrical formula discrete-type sensor given in a claim 18 with a wave authentication terminal The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the light emitting device which a photo detector \*\*\*\*s is outputted to a fire receiver. by the fire receiver side Based on the light income which the photo detector \*\*\*\*ed, the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income to which the photo detector \*\*\*\*ed fire alarm through the signal line further to the photoelectrical formula discrete-type sensor which is made to \*\*\*\* at the fire receiver



was prepared.

[0041] Also with this photoelectrical formula discrete-type sensor with a wave authentication terminal unit, since the wave authentication terminal unit is prepared in the fire receiver, a maintenance and a checker The fire receiver is installed also for \*\* by not going to the site in which the photoelectrical formula discrete-type sensor is installed, for example, at a janitor room etc. only by connecting wave display, such as an oscilloscope, to the wave authentication terminal of a wave authentication terminal unit The waves with the exact light income of a photo detector (voltage wave etc.) can be known easily and easily.

[0042]

[Gestalt of implementation of invention] Hereafter, the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention and the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention are explained still in detail, referring to a drawing.

(Gestalt 1 of implementation of invention) The gestalt 1 of implementation of invention explains the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention.

[0043] Drawing 1 is the block diagram showing roughly an example of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention. First, as a photoelectrical formula discrete-type sensor, the case where the photoelectrical formula discrete-type sensor for P type is used is made into an example, and it explains. As shown in drawing 1, it dissociates and opposite arrangement of this sensor 1 is carried out so that an optical axis may be in agreement in the light transmission machine 2 which has a light emitting device, and the electric eye 3 which has photo-detector 3a, and it discharges a pulsed light intermittently from the light transmission machine 2, and is made to \*\*\*\* by the electric eye 3. The electric eye 3 is connected to the fire receiver 6 through the signal line W1.

[0044] Although the above configuration is the same as that of the conventional photoelectrical formula discrete-type sensor 101 shown in drawing 11, the light income display unit 11 is newly formed in this sensor 1 through the signal line W2. The light income display unit 11 is formed in the height (low place) suitable for a man working from a floor line.

[0045] In this example, it connects with the output terminal of a microcomputer 4, and the light income of photo-detector 3a digitized by the predetermined art outputs a signal line W2 to the light income display unit 11 with a microcomputer 4. Drawing 2 (a) is the rough block diagram of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention.

[0046] This photoelectrical formula discrete-type sensor 1 with a light income display unit is equipped with the microcomputer 4, and the power and the \*\*\*\* circuit 5 other than photo-detector 3a in an electric eye 3. Threshold Lth is beforehand memorized as \*\*\*\* level of an electric eye 3 by the microcomputer 4. And when \*\*\*\* level L which photo-detector 3a of an electric eye 3 \*\*\*\*ed becomes below the threshold Lth ( $L \leq L_{th}$ ), it judges it as a fire, drives power and the \*\*\*\* circuit 5, and is made to \*\*\*\* fire alarm by the fire receiver 6.

[0047] In addition, the component equipment shown by eight shows the amplifier circuit which amplifies the light income which the photo detector of an electric eye 3 \*\*\* ed

among drawing 2 (a), and the gain changes this amplifier circuit 8 by light income adjustment means (light income adjustment means 14 shown in drawing 3 ) to mention later. Next, the configuration of the light income display unit 11 is explained.

[0048] Drawing 3 is the block diagram showing the light income display unit 11 roughly. The light income display unit 11 is equipped with lid 11a which can be opened and closed, and unit mainframe 11b by the key (not shown). In addition, the component the component shown by 11c indicates a keyhole to be by 11d again shows the key component which \*\*\*\*\*s to keyhole 11c by operation of a key (not shown) among drawing 3 .

[0049] Unit mainframe 11b is equipped with the light income level display means 12, the mode change-over switch 13 which switches this photoelectrical formula discrete-type sensor 1a to a fire supervision mode and the light income adjustment mode of a photo detector, and the light income adjustment means 14. In this example, Light Emitting Diodes 12a, 12b, and 12c of a plurality (this example three pieces) are used as a light income level display means 12.

[0050] the time of the mode change-over switch 13 being set to the fire supervision-mode side, as for two or more Light Emitting Diode 12a, 12b, and 12c -- any -- although -- the light is made not to switch on In addition, when the mode change-over switch 13 is set to the fire supervision-mode side, a pulsed light is intermittently discharged for the light emitting device of the light transmission machine 2 at 1 time of a rate at 5 seconds, and the photo detector of an electric eye 3 is made to have light income level measured by 5 seconds at 1 time of a rate in this example.

[0051] On the other hand, when the mode change-over switch 13 is set to the light income adjustment mode side of a photo detector, based on the light income of the aforementioned photo detector at the time of the light income adjustment mode being chosen, either of two or more Light Emitting Diode 12a, 12b, and 12c is made to turn on. In this example, Light Emitting Diode 12a is made to turn on, when the light income level of the photo detector of an electric eye 3 runs short.

[0052] Light Emitting Diode 12b is made to turn on when the light income level of the photo detector of an electric eye 3 is proper. Moreover, Light Emitting Diode 12c is made to turn on when the light income level of the photo detector of an electric eye 3 is excessive. If it explains in detail, in this photoelectrical formula discrete-type sensor 1a, two threshold for light income level distinction  $L_{dth}$  and  $L_{bth}$  of a value larger than threshold  $L_{th}$  is beforehand memorized by the microcomputer 4.

[0053] In this sensor 1, if the analog value  $L_a$  of the light income level of the photo detector of an electric eye 3 is between threshold  $L_{dth}$  for light income level distinction, and threshold  $L_{bth}$  for light income level distinction ( $L_{dth} \leq L_a \leq L_{bth}$ ), it will be supposed that the light income level of the photo detector of an electric eye 3 is proper, and only Light Emitting Diode 12b will be made to turn on in this case.

[0054] Moreover, for example, dirt, such as a lens fraction (not shown) of the light transmission machine 2 and a light-transmission aperture (not shown) of an electric eye 3, results, and the light income of photo-detector 3a of an electric eye 3 falls in many years past. And only Light Emitting Diode 12a will be made to turn on if the analog value  $L_a$  of the light income of photo-detector 3a of an electric eye 3 becomes under threshold  $L_{dth}$  for light income level distinction ( $L_a < L_{dth}$ ).

[0055] Moreover, even if the analog value  $L_a$  of the light income of photo-detector 3a of

an electric eye 3 is bright, a fire breaks out and smoke flows between the light transmission machine 2 and the electric eye 3 like [ when the spacing between the light transmission machine 2 and the electric eye 3 is short ] Only Light Emitting Diode 12c is made to turn on when the light income level of photo-detector 3a of an electric eye 3 exceeds threshold  $L_{bth}$  for light income level distinction which does not become threshold  $L_{th}$  ( $L_a > L_{bth}$ ).

[0056] In addition, when the mode change-over switch 13 is set to the light income adjustment mode side, a pulsed light is intermittently discharged for the light emitting device of the light transmission machine 2 at 1 time of a rate at 1 second, and photo-detector 3a of an electric eye 3 is made to have light income level measured by 1 second at 1 time of a rate in this example. By furthermore, the thing for which the light income adjustment means 14 is constituted from this sensor 1a by non-phase adjustment switches, such as a slide formula or a dial formula, and the light income adjustment means 14 is adjusted. If the analog value  $L_a$  of the light income level of photo-detector 3a of an electric eye 3 becomes between threshold  $L_{dth}$  for light income level distinction, and threshold  $L_{bth}$  for light income level distinction ( $L_{dth} \leq L_a \leq L_{bth}$ ) If Light Emitting Diode 12b lights up and the analog value  $L_a$  of the light income level of the photo detector of an electric eye 3 becomes under threshold  $L_{dth}$  for light income level distinction ( $L_a < L_{dth}$ ) Light Emitting Diode 12c is made to turn on, when Light Emitting Diode 12a is made to turn on and threshold  $L_{bth}$  for light income level distinction is exceeded ( $L_a > L_{bth}$ ).

[0057] Thereby, seeing the lighting status of two or more Light Emitting Diode 12a, 12b, and 12c, if the mode change-over switch 13 is made into a light income adjustment mode side, a maintenance and a checker can only adjust the light income adjustment means 14, and can adjust the light income level of photo-detector 3a of an electric eye 3 to a proper value ( $L_{dth} \leq L_a \leq L_{bth}$ ) so that Light Emitting Diode 12b may light up.

[0058] In addition, in this sensor 1, if the light income adjustment means 14 is adjusted, the gain of the amplifier circuit 8 can be changed. Next, the initial configuration work by which this photoelectrical formula discrete-type sensor 1 with a light income display unit is carried out at the time of construction, and maintenance work are explained.

\*\*\*\*\* business -- first, a predetermined spacing is separated on the head lining and the light transmission machine 2 and the electric eye 3 are attached in it

[0059] Moreover, the light income display unit 11 is attached in the height (low place) suitable for a man working from a floor line. Next, lid 11a of the light income display unit 11 is opened using a key, and the mode change-over switch 13 is set to a light income adjustment mode side. Then, since either of two or more Light Emitting Diode 12a, 12b, and 12c prepared in light income display unit mainframe 11b lit up, after checking that smoke does not intervene between the light transmission machine 2 and the electric eye 3, adjustment operation of the light income adjustment means 14 is carried out, and Light Emitting Diode 12b is made to light up as occasion demands.

[0060] If Light Emitting Diode 12b lights up, the mode change-over switch 13 will be switched to a supervision mode. Then, lid 11a is closed.

When the \*\*\*\* level amendment function is not attached to a sensor 1 below maintenance work After checking that a maintenance and a checker open lid 11a of the light income display unit 11 using a key, and sets the mode change-over switch 13 to a light income adjustment mode side suitably, and smoke does not intervene between the

light transmission machine 2 and the electric eye 3 If adjustment operation of the light income adjustment means 14 is carried out, Light Emitting Diode 12b is made to light up and Light Emitting Diode 12b lights up as occasion demands, after switching the mode change-over switch 13 to a supervision mode, check work of closing lid 11a is performed.

[0061] moreover, when \*\*\*\* level zero offset capability is attached to the sensor 1 If the automatic amendment of the \*\*\*\* level becomes impossible as for photoelectrical formula discrete-type sensor 1a, since it will output an alarm, a maintenance and a checker After cleaning photoelectrical formula discrete-type sensor 1a which outputted the alarm, lid 11a of the light income display unit 11 is opened using a key, and the mode change-over switch 13 is set to a light income adjustment mode side. between the light transmission machine 2 and the electric eye 3 If adjustment operation of the light income adjustment means 14 is carried out, Light Emitting Diode 12b is made to light up and Light Emitting Diode 12b lights up as occasion demands, after checking that smoke does not intervene, after switching the mode change-over switch 13 to a supervision mode, check work of closing lid 11a is performed.

[0062] Next, the case where the photoelectrical formula discrete-type sensor for R forms is used is made into an example, and other examples of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention are explained. Photoelectrical formula discrete-type sensor with light income display unit 1a shown in drawing 2 (b) is the fire receiver 6 connected to sensor 1a, and is made to distinguish a fire. If the following configurations are removed, since this sensor 1a is the same configuration as a sensor 1 in a sensor 1, it gives a corresponding reference mark to corresponding component equipment, and omits the explanation.

[0063] This sensor 1a does not have power and the \*\*\*\* circuit 5 in an electric eye 3. to a microcomputer 4 The threshold Lth which judges whether it is a fire is not memorized, but they are the fire receiver 6 or a repeater (it does not illustrate.) from a microcomputer 4. The analog value which the electric eye 3 \*\*\*\*ed carries out firm output. Threshold Lth is made to memorize beforehand as \*\*\*\* level of an electric eye 3, and when \*\*\*\* level L which the electric eye 3 \*\*\*\*ed becomes below the threshold Lth ( $L \leq Lth$ ), it is made to \*\*\*\* fire alarm with the fire receiver 6 by the fire receiver 6.

[0064] In addition, since initial configuration work and maintenance work of this sensor 1a are the same as that of a sensor 1, an explanation here is omitted. In the photoelectrical formula discrete-type sensors 1 and 1a with a light income display unit Newly form the light income display unit 11, and when needing to be adjusted in connection with the secular change of the photoelectrical formula discrete-type sensors 1 and 1a, in order that a maintenance and a checker may investigate the cause when a trouble and a false report occur in the photoelectrical formula discrete-type sensors 1 and 1a As it does not reach to the place in which sensors 101 and 101a are purposely attached like before but \*\* is also shown in drawing 1 , in the status that it stood on the floor By the light income display unit 11 side, since it enabled it to check the light income level of photo-detector 3a, the trouble of the photoelectrical formula discrete-type sensors 1 and 1a and the cause of a false report can be known easily and easily.

[0065] Moreover, the light income adjustment mode and the light income adjustment means 14 are formed in the light income display unit 11. Thereby, in case it adjusts the light income level of photo-detector 3a of the photoelectrical formula discrete-type sensor

1, purposely, like the conventional sensor 101, a maintenance and a checker are not reached to the height in which sensors 101 and 101a are attached, but \*\* is also the light income display unit 11, and it can adjust the light income level of photo-detector 3a easily and easily.

[0066] furthermore, the case where the light income adjustment mode is chosen by the mode change-over switch 13 -- as long as -- any of two or more Light Emitting Diode 12a, 12b, and 12c when either of two or more Light Emitting Diode 12a, 12b, and 12c is made to light up and the fire supervision mode is chosen -- although -- it is made not to switch on the light The consumed electric current in case the fire supervision mode is chosen can be stopped low by this, and it is also enabled to connect many photoelectrical formula discrete-type sensors 1 and 1a with a light income display unit to one supply power.

[0067] Moreover, by the mode change-over switch 13, if selection operation of the light income adjustment mode is carried out It is based on the light income of photo-detector 3a at the time of the light income adjustment mode being chosen. Light Emitting Diode 12a turned on when the light income level of photo-detector 3a is insufficient, If either of the Light Emitting Diode 12c turned on when Light Emitting Diode 12b turned on when the light income level of photo-detector 3a is proper, and the light income level of photo-detector 3a are excessive lights up and the light income adjustment means 14 is adjusted The gain of the amplifier circuit 8 changes and the adjustment status of the light income adjustment means 14 is embraced. Either of the Light Emitting Diode 12c turned on when Light Emitting Diode 12b turned on when the light income level of Light Emitting Diode 12a and photo-detector 3a turned on when the light income level of photo-detector 3a is insufficient is proper, and the light income level of photo-detector 3a are excessive is made to turn on.

[0068] Thereby, seeing the lighting status of these Light Emitting Diodes 12a, 12b, and 12c, if the light income adjustment mode is chosen, a maintenance and a checker are easy operations of adjusting the light income adjustment means 14, and can adjust the light income level of photo-detector 3a of an electric eye 3 to a proper value so that Light Emitting Diode 12b turned on when the light income level of photo-detector 3a is proper may light up.

[0069] Moreover, since Light Emitting Diodes 12a, 12b, and 12c are chosen as a display means to display the light income level of photo-detector 3a, in these photoelectrical formula discrete-type sensors 1 and 1a with a light income display unit, the light income level of photo-detector 3a is visually intelligible. And since Light Emitting Diodes 12a, 12b, and 12c are cheap, they can supply the cheap photoelectrical formula discrete-type sensor 1 with a light income display unit to a commercial scene.

(Gestalt 2 of implementation of invention) The gestalt 2 of implementation of invention explains the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention.

[0070] Drawing 4 (a) is the block diagram showing roughly the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention. As shown in drawing 4 (a), it dissociates and opposite arrangement of this sensor 1c is carried out so that an optical axis may be in agreement in the light transmission machine 2 which has a light emitting device, and the electric eye 3 which has photo-detector 3a, and it discharges a pulsed light intermittently from the light transmission machine 2, and

is made to \*\*\*\* by the electric eye 3. The electric eye 3 is connected to the fire receiver 6 through the signal line W1.

[0071] The amplifier circuit 8 is connected to photo-detector 3a, and the light income which photo-detector 3a \*\*\*\*ed is amplified by the amplifier circuit 8, and is inputted into a microcomputer 4. Power and the \*\*\*\* circuit 5 are connected to the microcomputer 4. Moreover, threshold Lth is beforehand memorized by the microcomputer 4 as \*\*\*\* level of an electric eye 3. And when \*\*\*\* level L which photo-detector 3a of an electric eye 3 \*\*\*\*ed becomes below the threshold Lth ( $L \leq Lth$ ), it judges it as a fire, drives power and the \*\*\*\* circuit 5, and is made to \*\*\*\* fire alarm by the fire receiver 6.

[0072] Although the above configuration is the same as that of the sensor 1 shown in drawing 1, the wave authentication terminal unit 21 is formed in this sensor 1c through signal lines W3 and W4. The wave authentication terminal unit 21 is formed in the low place like the light income display unit 11 of the photoelectrical formula discrete-type sensor 1 with a light income display unit. Moreover, the \*\*\*\* level automatic amendment program is memorized, and if the automatic amendment of the \*\*\*\* level becomes impossible as for this sensor 1c, it will output an alarm to a microcomputer 4.

[0073] Next, the configuration of the wave authentication terminal unit 21 is explained. Drawing 5 is the block diagram showing the wave authentication terminal unit 21 roughly. The wave authentication terminal unit 21 is boiled by the key (not shown), and is equipped with lid 21a which can be opened and closed more, and unit mainframe 21b. In addition, the component the component shown by 21c indicates a keyhole to be by 21d again shows the opening of a key (not shown) among drawing 5.

[0074] The output terminals 22 and 23 for connecting wave metering devices (not shown), such as an oscilloscope, and the terminal for grand line connection 24 are formed in unit mainframe 21b. It connects with the signal line W3 drawn from the output terminal of the amplifier circuit 8, photo-detector 3a \*\*\*\*s an output terminal 22, and the light income of photo-detector 3a amplified by the amplifier circuit 8 outputs it as it is as an analog value.

[0075] Therefore, if wave metering devices (not shown), such as an oscilloscope, are connected to an output terminal 22, the voltage level (wave) of the light income of photo-detector 3a to which the dirt amendment before processing by the \*\*\*\* level automatic amendment program is not carried out can be detected. The digital variable to which the dirt amendment after processing by the \*\*\*\* level [ which it connects with the signal line W4 drawn from the output terminal of a microcomputer 4, and photo-detector 3a \*\*\*\*ed the output terminal 23, was amplified by the amplifier circuit 8, and was memorized by the microcomputer 4 ] automatic-on the other hand amendment program was carried out outputs.

[0076] Therefore, if wave metering devices (not shown), such as an oscilloscope, are connected to an output terminal 23, the amendment light income of photo-detector 3a to which the dirt amendment after processing by the \*\*\*\* level automatic amendment program was carried out can be detected. In addition, in this example, the light income of photo-detector 3a of the electric eye 3 which emitted light to the microcomputer 4 and sampled the light emitting device of a projector 2 every 3 seconds at intervals of 3 seconds as a \*\*\*\* level automatic amendment program to it will be part-accumulated on the 1st, and the program of an amendment is memorized one by one by the zero level in

the average.

[0077] Next, the case where the photoelectrical formula discrete-type sensor for R forms is used is made into an example, and other examples of the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention are explained. 1d of the photoelectrical formula discrete-type sensors with a wave authentication terminal unit shown in drawing 4 (b) is the fire receiver 6 connected to 1d of sensors, and they are made to distinguish a fire. If the following configurations are removed, since sensor 1c is the same configuration as sensor 1c, 1d of this sensor gives a corresponding reference mark to corresponding component equipment, and it omits the explanation.

[0078] 1d of this sensor does not have power and the \*\*\*\* circuit 5 in an electric eye 3. to a microcomputer 4 The threshold  $L_{th}$  which judges whether it is a fire is not memorized, but they are the fire receiver 6 or a repeater (it does not illustrate.) from a microcomputer 4. The analog value which the electric eye 3 \*\*\*\*ed carries out firm output. Threshold  $L_{th}$  is made to memorize beforehand as \*\*\*\* level of an electric eye 3, and when \*\*\*\* level  $L$  which the electric eye 3 \*\*\*\*ed becomes below the threshold  $L_{th}$  ( $L \leq L_{th}$ ), it is made to \*\*\*\* fire alarm with the fire receiver 6 by the fire receiver 6.

[0079] In the photoelectrical formula discrete-type sensors 1c and 1d with a wave authentication terminal unit Since the wave authentication terminals 22 and 23 which detect the voltage variation based on the light income which photo-detector 3a \*\*\*\*ed were formed in the wave authentication terminal unit 21, a maintenance and a checker They are wave display (it does not illustrate.), such as an oscilloscope, to the wave authentication terminals 22 and 23 with which it does not reach to the place in which the sensor 101 is attached, but \*\* was also purposely prepared in the light income display unit 21 like the conventional sensor 101. Only by connecting, the waves with the exact light income of photo-detector 3a (voltage wave etc.) can be known easily and easily.

[0080] When it explains in detail, a maintenance and a checker are wave display (it does not illustrate.), such as an oscilloscope, to the wave authentication terminal 22 and the terminal for grand line connection 24. Purposely the light income of photo-detector 3a which it does not reach to the place in which the sensor 101 is attached, but photo-detector 3a also \*\*\*\*s \*\*, and was amplified by the amplifier circuit 8 like the conventional sensor 101 as an analog value Exact waves (voltage wave etc.) can be known easily and easily. Moreover, the amendment light income (digital variable) of photo-detector 3a to which the dirt amendment after processing by the \*\*\*\* level automatic amendment program was carried out can be known easily and easily only by connecting wave display (not shown), such as an oscilloscope, to the wave authentication terminal 23 and the terminal for grand line connection 24.

[0081] In addition, although this example explained the example in which the output terminal 22 was connected to the signal line W3 drawn from the output terminal of the amplifier circuit 8, and the output terminal 23 was connected to the signal line W4 drawn from the output terminal of a microcomputer 4 Signal lines W3 and W4 are connected to the output terminal of a microcomputer 4, an analog value may be outputted by the signal line W3, and amendment light income (digital variable) may be made to be outputted from a signal line W4 within a microcomputer 4.

[0082] As mentioned above, with the gestalt 1 of implementation of invention, although the example of the photoelectrical formula discrete-type sensor with a light income

display unit concerning this invention was explained and the example of the photoelectrical formula discrete-type sensor with a wave authentication terminal unit applied to this invention with the gestalt 2 of implementation of invention was explained, there are various modifications. Photoelectrical formula discrete-type sensor with light income display unit 1e shown in drawing 6 and drawing 7 has formed the light income level display means 12, the mode change-over switch 13, the light income adjustment means 14 and the wave authentication terminals 22 and 23, and the terminal for grand line connection 24 in the light income display unit 31.

[0083] Like photoelectrical formula discrete-type sensor with light income display unit 1e, to the light income display unit 31 The light income level display means 12 and the mode change-over switch 13, When the light income adjustment means 14, the wave authentication terminals 22 and 23, and the terminal for grand line connection 24 are formed In case a maintenance and a checker adjust the light income level of photo-detector 3a prepared in the electric eye 3 of a photoelectrical formula discrete-type sensor, it is not purposely reached to the place in which the electric eye 3 is attached, but \*\* is also the light income display unit 31. Easily and easily, the light income level of photo-detector 3a can be checked, it can adjust, or the waves with the exact light income of photo-detector 3a (voltage wave etc.) can be further known easily and easily only by connecting wave metering devices, such as an oscilloscope, to the wave authentication terminals 22 and 23.

[0084] Moreover, the photoelectrical formula discrete-type sensors 1f and 1g with a light income display unit shown in each of drawing 8 (a) and drawing 8 (b) show the example which formed the light income display unit 11 in the fire receiver 6. Like the photoelectrical formula discrete-type sensors 1f and 1g with a light income display unit, when the light income display unit 11 is formed in the fire receiver 6, it cannot go to the site in which the photoelectrical formula discrete-type sensor is installed, but the fire receiver 6 is installed, for example, the light income level of photo-detector 3a can be checked, or a maintenance and a checker can also adjust \*\* at a janitor room etc.

[0085] Moreover, the photoelectrical formula discrete-type sensors 1h and 1i with a wave authentication terminal unit shown in each of drawing 9 (a) and drawing 9 (b) show the example which formed the wave authentication terminal unit 21 in the fire receiver 6. Like the photoelectrical formula discrete-type sensors 1h and 1i with a wave authentication terminal unit, when the wave authentication terminal unit 21 is formed in the fire receiver 6 A maintenance and a checker do not go to the site in which the projector 2 and the electric eye 3 of a photoelectrical formula discrete-type sensor are installed, but the fire receiver 6 is installed also for \*\*. in a janitor room etc. without moving from its seat The waves with the exact light income of photo-detector 3a (voltage wave etc.) can be known easily and easily only by connecting wave metering devices, such as an oscilloscope, to the wave authentication terminals 22 and 23.

[0086] Furthermore, the photoelectrical formula discrete-type sensors 1j and 1k with a wave authentication terminal unit shown in each of drawing 10 (a) and drawing 10 (b) show again the example which formed the light income display unit 31 in the fire receiver 6. Like the photoelectrical formula discrete-type sensors 1j and 1k with a wave authentication terminal unit, when the light income display unit 31 is formed in the fire receiver 6 A maintenance and a checker do not go to the site in which the photoelectrical formula discrete-type sensors 2 and 3 are installed, but the fire receiver 6 is installed also



for \*\*. in a janitor room etc. without moving from its seat The waves with the exact light income of photo-detector 3a (voltage wave etc.) can be known easily and easily only by being able to check or adjust the light income level of photo-detector 3a, and connecting wave metering devices, such as an oscilloscope, to the wave authentication terminals 22 and 23.

[0087] With the gestalt of implementation of this invention, again furthermore, as photoelectrical formula discrete-type sensors 1, 1a, 1e, 1f, 1g, 1j, and 1k with a light income display unit Although the example which formed two or more Light Emitting Diode 12a, 12b, and 12c as a light income level display means 12 of the light income display units 11, 21, and 31 was explained It does not pass over this to have explained the example only desirable, but as long as it excels in visibility, various display meanses can be used for the light income level display means 12, and a level meter, CRT, liquid crystal, etc. can also be used for it as such a light income level display means 12, for example. And if two or more Light Emitting Diodes, level meters, CRT, liquid crystal, etc. are used as a light income level display means 12 to display the light income level of photo-detector 3a, the variation of goods can be extended and, thereby, the goods which suited the needs of the diversified customer can be supplied to a commercial scene.

## CLAIMS

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### [Claim]

[Claim 1] The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between the aforementioned light transmission machine and the aforementioned electric eye by detecting decrement of the light which the aforementioned photo detector \*\*\*\*s In the photoelectrical formula discrete-type sensor which distinguishes the existence of a fire and \*\*\*\*s fire alarm to a fire receiver to the above-mentioned electric eye The photoelectrical formula discrete-type sensor with a light income display unit which connects the light income display unit on which the \*\*\*\* level of the aforementioned photo detector is displayed through a signal line, and enabled it to check the light income level of the aforementioned photo detector in the aforementioned light income display unit.

[Claim 2] The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light which the aforementioned photo detector \*\*\*\*s is outputted to a fire receiver. by the aforementioned fire receiver side In the photoelectrical formula discrete-type sensor which is made to \*\*\*\* fire alarm based on the light income which the aforementioned photo detector \*\*\*\*ed to the above-mentioned electric eye The photoelectrical formula discrete-type sensor with a light income display unit which connects the light income display unit on which the \*\*\*\* level of the aforementioned

photo detector is displayed through a signal line, and enabled it to check the light income level of the aforementioned photo detector in the aforementioned light income display unit.

[Claim 3] The mode transfer switch to which the aforementioned light income display unit switches a fire supervision mode and the light income adjustment mode of a photo detector, If it has the light income level display means of the light income of the aforementioned photo detector, and a light income adjustment means to adjust the light income of the aforementioned photo detector and selection operation of the light income adjustment mode of the aforementioned photo detector is carried out So that the light income of the aforementioned photo detector as which the light income of the aforementioned photo detector at the time of the aforementioned light income adjustment mode being chosen is displayed on the aforementioned light income level display means, and is displayed on the aforementioned light income level display means may become a proper value The photoelectrical formula discrete-type sensor given in the claim 1 or the claim 2 to which the light income of the aforementioned photo detector will be made to become proper if the aforementioned light income adjustment means is adjusted with a light income display unit.

[Claim 4] The photoelectrical formula discrete-type sensor given in the claim 3 whose light income level display means is either of the display meanses, such as two or more lamps, a level meter, CRT, and liquid crystal, with a light income display unit.

[Claim 5] The photoelectrical formula discrete-type sensor given in the claim 3 equipped with the lamp turned on when the light income level of the aforementioned photo detector runs short of the light income level display meanses of the aforementioned light income display unit, the lamp turned on when the light income level of the aforementioned photo detector is proper, and the lamp turned on when the light income level of the aforementioned photo detector is excessive with a light income display unit.

[Claim 6] It can set, when the aforementioned light income adjustment mode will be chosen, if selection operation of the light income adjustment mode of the aforementioned photo detector was carried out. The lamp turned on when the light income level of the aforementioned photo detector is insufficient based on the light income of the aforementioned photo detector, By either of the lamps turned on when the lamp turned on when the light income level of the aforementioned photo detector is proper, and the light income level of the aforementioned photo detector are excessive lighting up, and adjusting the aforementioned light income adjustment means The photoelectrical formula discrete-type sensor given in the claim 5 which either of the aforementioned lamps is made to turn on with a light income display unit.

[Claim 7] The photoelectrical formula discrete-type sensor given in either of the claims 1-6 which prepared the wave authentication terminal which detects further the voltage variation based on the light income which the aforementioned photo detector \*\*\*\*ed in the aforementioned light income display unit with a light income display unit.

[Claim 8] The photoelectrical formula discrete-type sensor given in either of the claims 3-7 the aforementioned photo detector will measure light income level at a predetermined time rate if selection operation of the light income adjustment mode of the aforementioned photo detector is carried out, and the aforementioned photo detector is made to have light income level measured by the time interval longer than instrumentation of the above-mentioned light income level if selection operation of the

aforementioned fire supervision mode is carried out with a light income display unit.

[Claim 9] The aforementioned light transmission machine and the aforementioned electric eye are a photoelectrical formula discrete-type sensor given in either of the claims 1-8 by which it is installed in a height and the aforementioned light income display unit is installed in the low place with a light income display unit.

[Claim 10] The photoelectrical formula discrete-type sensor given in either of the claims 1-9 which prepared the lid which can be opened and closed by the key in the aforementioned light income display unit with a light income display unit.

[Claim 11] The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between the aforementioned light transmission machine and the aforementioned electric eye by detecting decrement of the light which the aforementioned photo detector \*\*\*\*s The existence of a fire is distinguished and the light income display unit on which the \*\*\*\* level of a photo detector is displayed through a signal line at the aforementioned fire receiver is further connected to the photoelectrical formula discrete-type sensor which \*\*\*\*s fire alarm to a fire receiver. in a light income display unit The photoelectrical formula discrete-type sensor with a light income display unit which enabled it to check the light income level of a photo detector.

[Claim 12] The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the aforementioned light emitting device which the aforementioned photo detector \*\*\*\*s is outputted to a fire receiver. by the aforementioned fire receiver side In the photoelectrical formula discrete-type sensor which is made to \*\*\*\* fire alarm based on the light income which the aforementioned photo detector \*\*\*\*ed The photoelectrical formula discrete-type sensor with a light income display unit which connects the light income display unit which displays the \*\*\*\* level of the aforementioned photo detector on the aforementioned fire receiver through a signal line, and enabled it to check the light income level of a photo detector in a light income display unit.

[Claim 13] The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between the aforementioned light transmission machine and the aforementioned electric eye by detecting decrement of the light which the aforementioned photo detector \*\*\*\*s In the photoelectrical formula discrete-type sensor which distinguishes the existence of a fire and \*\*\*\*s fire alarm to a fire receiver to the above-mentioned electric eye The photoelectrical formula discrete-type sensor with a wave authentication terminal unit which prepared the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income which the aforementioned photo detector \*\*\*\*ed through a signal line.

[Claim 14] The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the aforementioned light emitting device which the aforementioned photo detector \*\*\*\*s is outputted to a fire receiver. by the aforementioned fire receiver side In the photoelectrical formula discrete-type sensor which is made to \*\*\*\* fire alarm based on the light income which the aforementioned photo detector \*\*\*\*ed to the above-mentioned electric eye The photoelectrical formula

discrete-type sensor with a wave authentication terminal unit which prepared the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income which the aforementioned photo detector \*\*\*\*ed through a signal line.

[Claim 15] The aforementioned light transmission machine and the aforementioned electric eye are a photoelectrical formula discrete-type sensor given in the claim 13 or the claim 14 by which it is installed in a height and the aforementioned wave authentication terminal unit is installed in the low place with a wave authentication terminal unit.

[Claim 16] The photoelectrical formula discrete-type sensor given in either of the claims 13-15 which prepared the lid which can be opened and closed by the key in the aforementioned wave authentication terminal unit with a wave authentication terminal unit.

[Claim 17] The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, is arranged, and by the smoke between the aforementioned light transmission machine and the aforementioned electric eye by detecting the decrement of the light irradiated from the aforementioned light emitting device which the aforementioned photo detector \*\*\*\*s In the photoelectrical formula discrete-type sensor which distinguishes the existence of a fire and \*\*\*\*s fire alarm to a fire receiver The photoelectrical formula discrete-type sensor with a wave authentication terminal unit which prepared the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income which the aforementioned photo detector \*\*\*\*ed to the aforementioned fire receiver.

[Claim 18] The light transmission machine which has a light emitting device, and the electric eye which has a photo detector dissociate, and is arranged, and the light income of the light irradiated from the aforementioned light emitting device which the aforementioned photo detector \*\*\*\*s is outputted to a fire receiver. by the aforementioned fire receiver side In the photoelectrical formula discrete-type sensor which is made to \*\*\*\* fire alarm based on the light income which the aforementioned photo detector \*\*\*\*ed The photoelectrical formula discrete-type sensor with a wave authentication terminal unit which prepared the wave authentication terminal unit which has the wave authentication terminal which detects the voltage variation based on the light income which the aforementioned photo detector \*\*\*\*ed through the signal line to the aforementioned fire receiver.

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## DESCRIPTION OF DRAWINGS

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[An easy explanation of a drawing]

[ Drawing 1 ] It is the block diagram showing roughly an example of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention.

[ Drawing 2 ] It is the block diagram showing roughly the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention, and drawing 2 (b) shows respectively the rough block diagram of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention with which the photoelectrical formula discrete-type sensor for R forms was again used in the

block diagram of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention with which the photoelectrical formula discrete-type sensor for P type was used with rough drawing 2 (a).

[ Drawing 3 ] It is the block diagram showing roughly the light income display unit used with the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention.

[ Drawing 4 ] It is the block diagram showing roughly the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention, and drawing 4 (b) shows respectively the rough block diagram of the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention with which the photoelectrical formula discrete-type sensor for R forms was again used in the block diagram of the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention with which the photoelectrical formula discrete-type sensor for P type was used with rough drawing 4 (a).

[ Drawing 5 ] It is the block diagram showing roughly the wave authentication terminal unit used with the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention.

[ Drawing 6 ] It is the block diagram showing roughly other examples of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention.

[ Drawing 7 ] It is the block diagram showing roughly the light income display unit used with the photoelectrical formula discrete-type sensor with a light income display unit shown in drawing 6.

[ Drawing 8 ] It is the block diagram showing roughly the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention, and drawing 8 (b) shows respectively the rough block diagram of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention with which the photoelectrical formula discrete-type sensor for R forms was again used in the block diagram of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention with which the photoelectrical formula discrete-type sensor for P type was used with rough drawing 8 (a).

[ Drawing 9 ] It is the block diagram showing roughly the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention. drawing 9 (a) The rough block diagram of the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention with which the photoelectrical formula discrete-type sensor for P type was used moreover, drawing 9 (b) The block diagram showing roughly the photoelectrical formula discrete-type sensor with a wave authentication terminal unit concerning this invention with which the photoelectrical formula discrete-type sensor for R forms was used is shown respectively.

[ Drawing 10 ] Drawing 10 (b) shows the rough block diagram of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention with which the photoelectrical formula discrete-type sensor for R forms was again used in the block diagram of the photoelectrical formula discrete-type sensor with a light income display unit concerning this invention with which the photoelectrical formula discrete-type sensor for P type was used with rough charge drawing 10 (a) respectively to

this invention.

[ Drawing 11 ] It is the block diagram showing the conventional photoelectrical formula discrete-type sensor roughly.

[ Drawing 12 ] It is the block diagram showing the conventional photoelectrical formula discrete-type sensor roughly, and drawing 12 (a) is the sensor itself, and the photoelectrical formula discrete-type sensor for the conventional P type which was made to distinguish the fire is shown, and drawing 12 (b) is a fire receiver and shows the photoelectrical formula discrete-type sensor for the conventional R forms which was made to distinguish the fire.

[An explanation of a sign]

1, 1a, 1e, 1f, 1g Photoelectrical formula discrete-type sensor with a light income display unit

1c, 1d, 1h, 1i Photoelectrical formula discrete-type sensor with a wave authentication terminal unit

2 Projector

3 Electric Eye

3a Photo detector

4 Microcomputer

5 Power and \*\*\*\* Circuit

6 Fire Receiver

8 Amplifier Circuit

11, 31 Light income display unit

11a Lid

11b Light income display unit mainframe

11c Keyhole

11d Key component

12 Light Income Level Display Means

12a, 12b, 12c Light Emitting Diode

13 Mode Change-over Switch

14 Light Income Adjustment Means

21 Wave Authentication Terminal Unit

22, 23 Output terminal

24 Terminal for Grand Line Connection

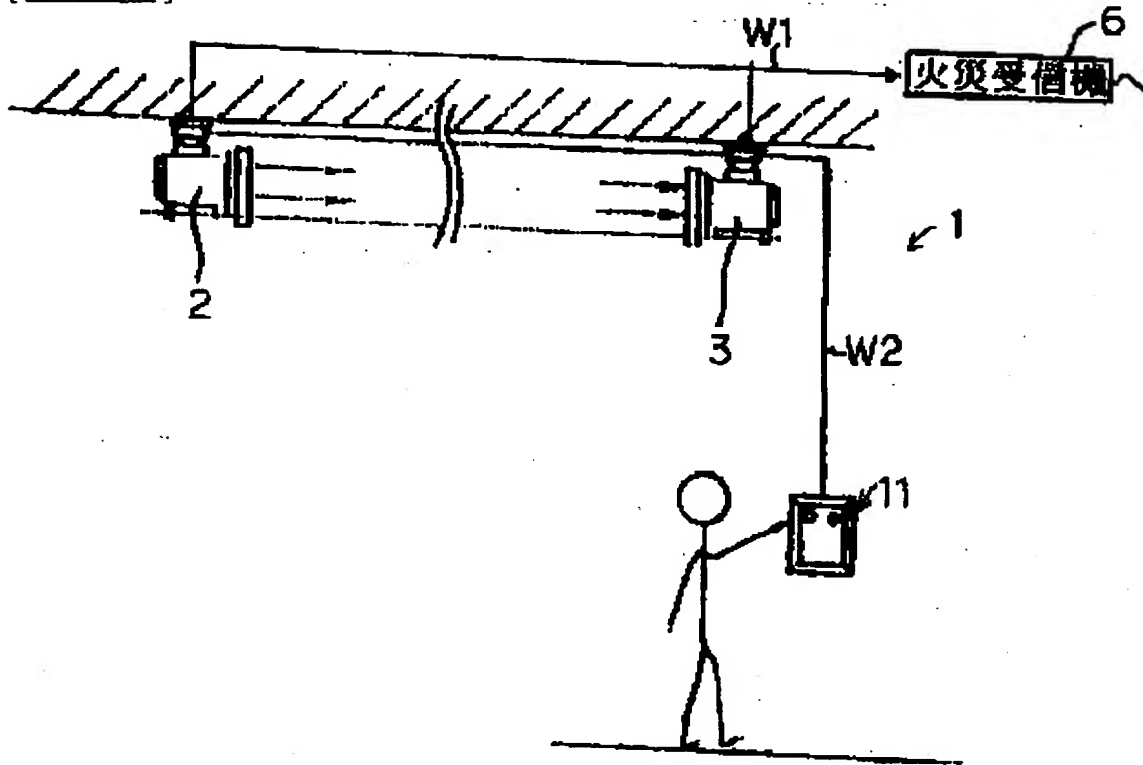
W1, W2, W3, W4 Signal line

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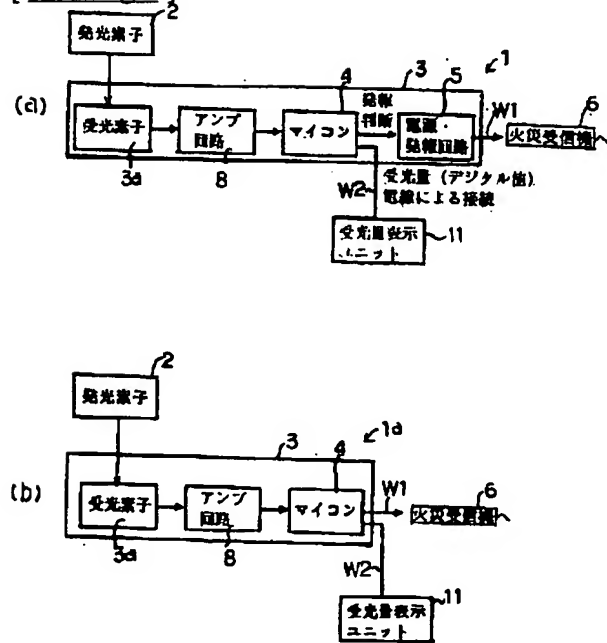
## DRAWINGS

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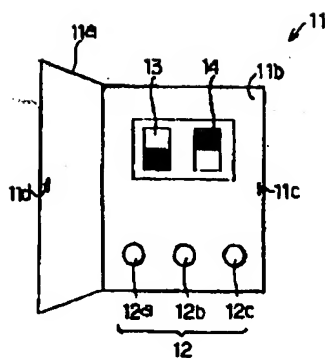
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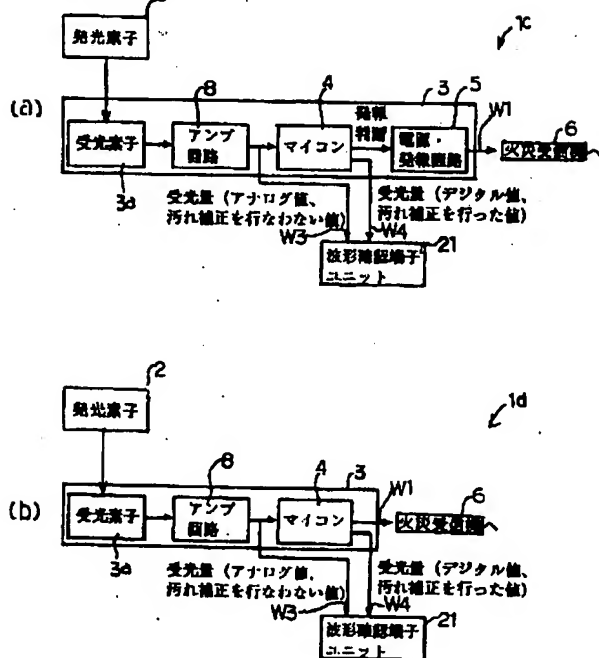
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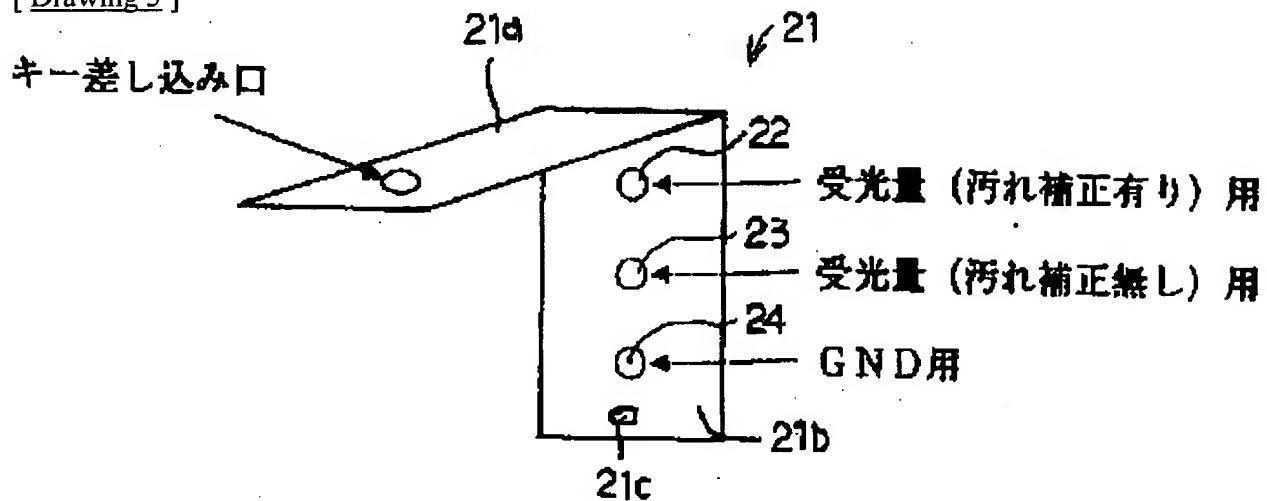
[ Drawing 3 ]



[ Drawing 4 ]

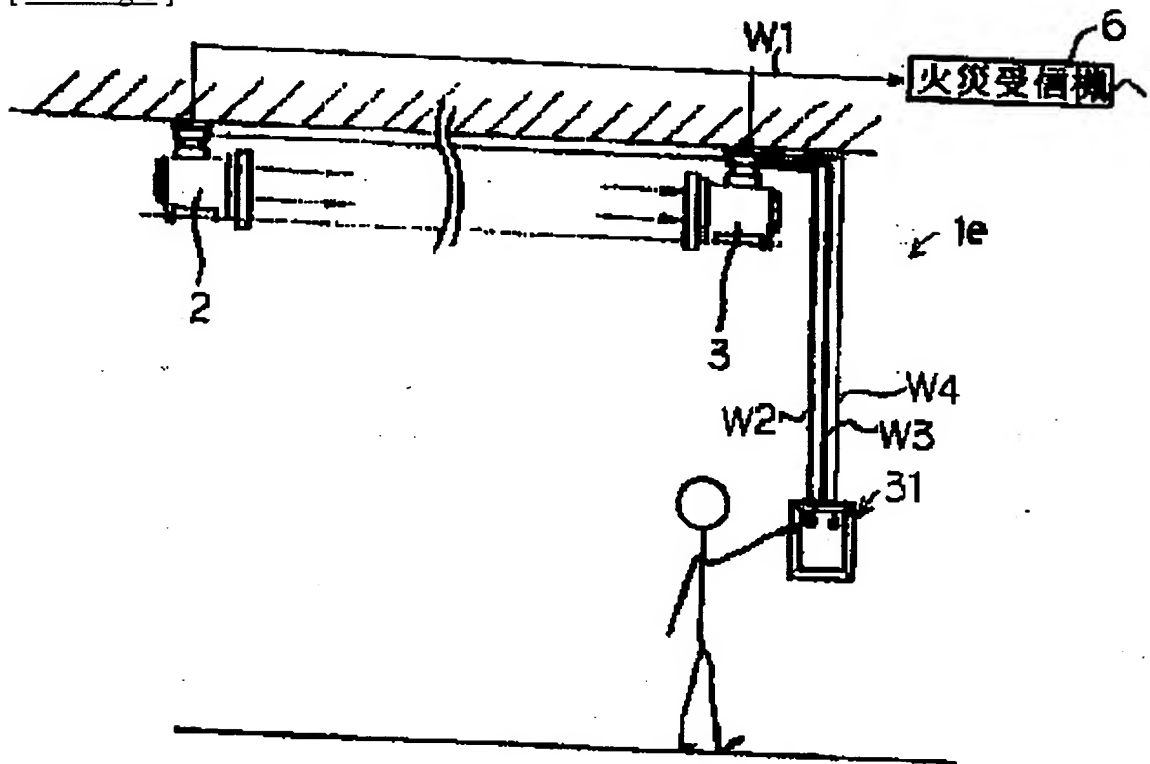


[ Drawing 5 ]

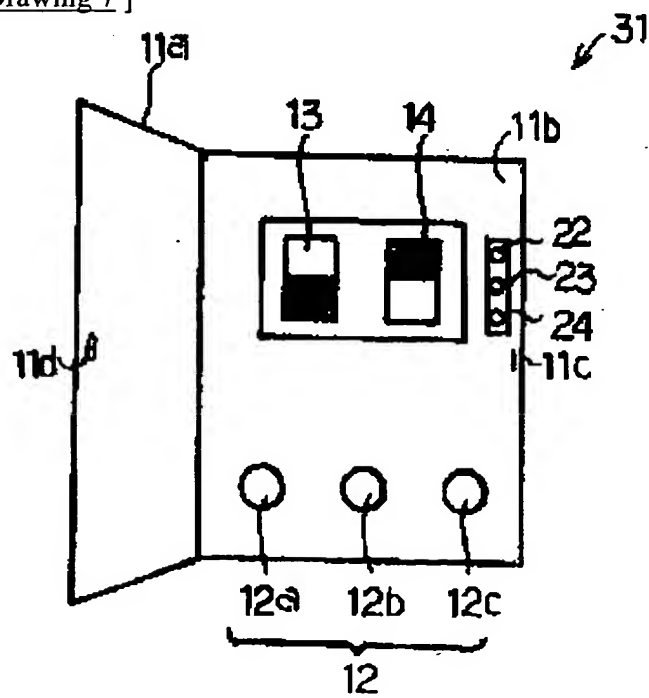




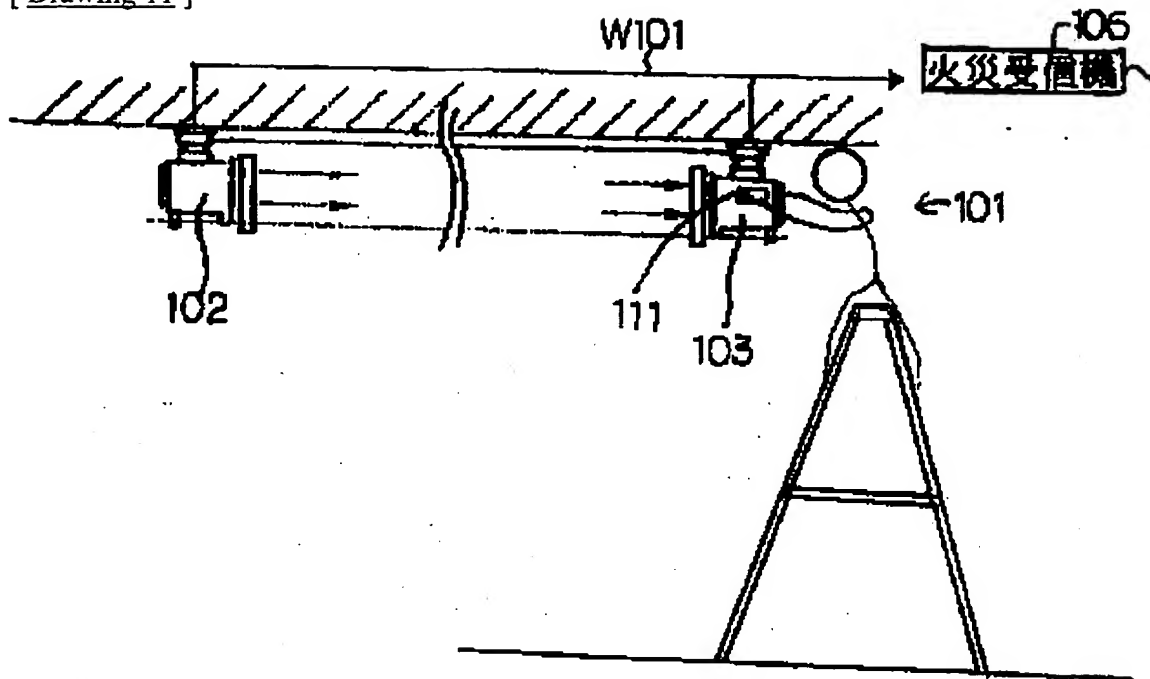
[ Drawing 6 ]



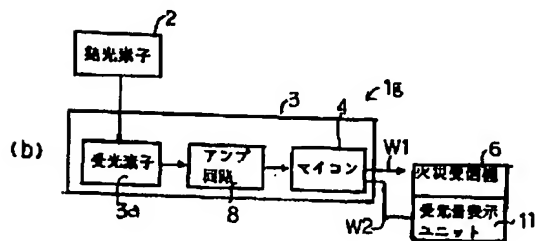
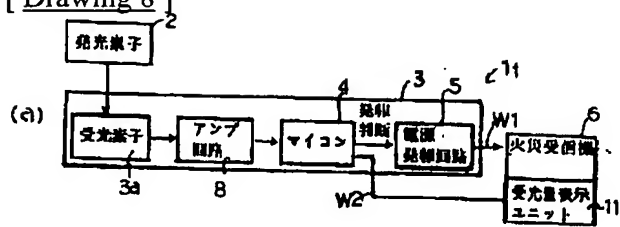
[ Drawing 7 ]



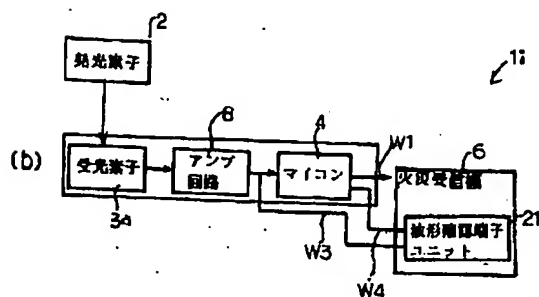
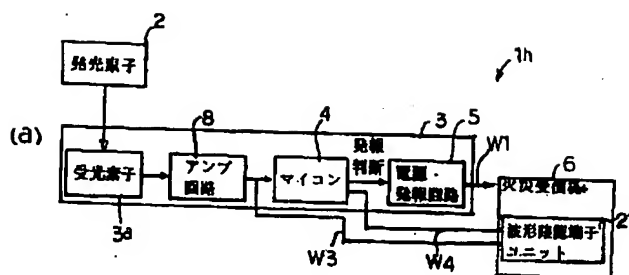
[ Drawing 11 ]



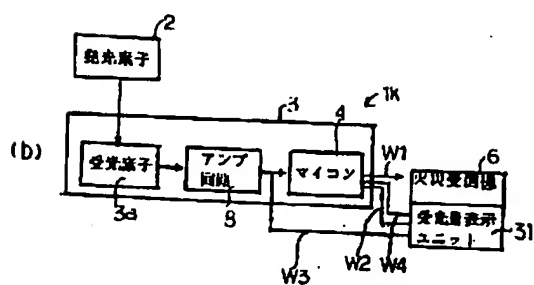
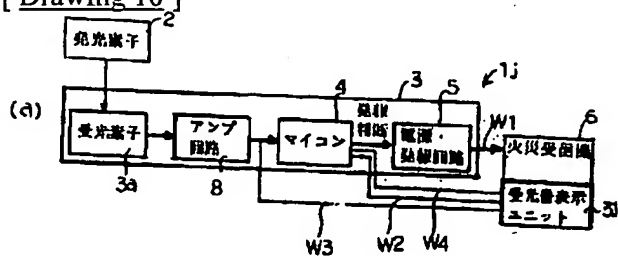
[ Drawing 8 ]



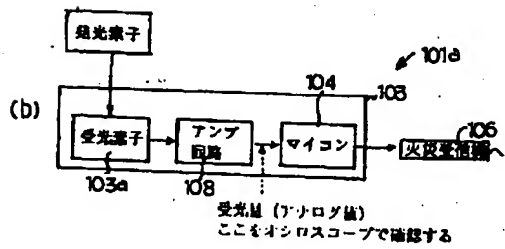
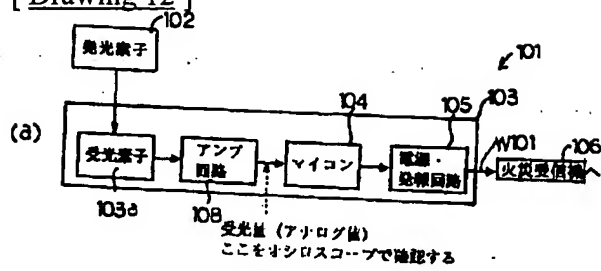
[ Drawing 9 ]



[ Drawing 10 ]



[ Drawing 12 ]



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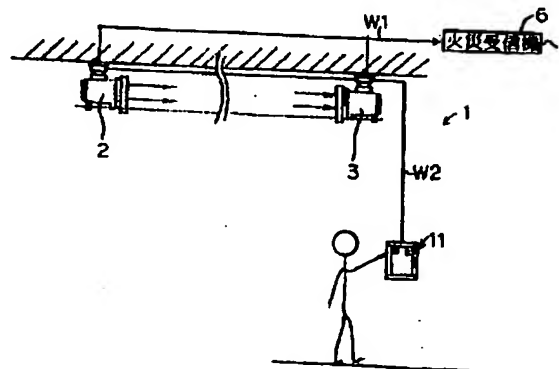
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(54) 【発明の名称】 受光量表示ユニット付き光電式分離型感知器及び波形確認端子ユニット付き光電式分離型感知器

(57) 【要約】

【課題】 光電式分離型感知器の施工時やトラブル等が発生した場合にも、光電式分離型感知器が取り付けられている天井等の高所に保守・点検者が登らずとも、受光量の調整や、トラブル等の原因を簡単に調べることができるようにした、受光量表示ユニット付き光電式分離型感知器を提供する。

【解決手段】 光電式分離型感知器2、3に、更に、信号線W1を介して、受光素子3aの受光レベルを表示させる受光量表示ユニット11を接続し、受光量表示ユニット11で、受光素子3aの受光量レベルを確認できるようにしている。



【特許請求の範囲】

【請求項1】発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、前記送光器と前記受光器との間の煙により、前記受光素子が受光する光の減衰を検知することで、火災の有無を判別し、火災受信機へ火災警報を発報する光電式分離型感知器において、上記受光器には、信号線を介して、前記受光素子の受光レベルを表示させる受光量表示ユニットを接続し、前記受光量表示ユニットで、前記受光素子の受光量レベルを確認できるようにした、受光量表示ユニット付き光電式分離型感知器。

【請求項2】発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、前記受光素子が受光する光の受光量を火災受信機へ出力し、前記火災受信機側で、前記受光素子が受光した受光量に基づいて、火災警報を発報するようにされている光電式分離型感知器において、上記受光器には、信号線を介して、前記受光素子の受光レベルを表示させる受光量表示ユニットを接続し、前記受光量表示ユニットで、前記受光素子の受光量レベルを確認できるようにした、受光量表示ユニット付き光電式分離型感知器。

【請求項3】前記受光量表示ユニットは、火災監視モードと、受光素子の受光量調整モードとを切り換えるモード切り換えスイッチと、前記受光素子の受光量の受光量レベル表示手段と、前記受光素子の受光量を調整する受光量調整手段とを備え、前記受光素子の受光量調整モードを選択操作すれば、前記受光量調整モードが選択された時点における、前記受光素子の受光量が、前記受光量レベル表示手段に表示され、前記受光量レベル表示手段に表示されている前記受光素子の受光量が適正値になるように、前記受光量調整手段を調整すれば、前記受光素子の受光量が適正になるようにされている、請求項1又は請求項2に記載の受光量表示ユニット付き光電式分離型感知器。

【請求項4】受光量レベル表示手段が、複数のランプ、レベルメータ、CRT及び液晶等の表示手段のいずれかである、請求項3に記載の受光量表示ユニット付き光電式分離型感知器。

【請求項5】前記受光量表示ユニットの受光量レベル表示手段が、前記受光素子の受光量レベルが不足している場合に点灯するランプと、前記受光素子の受光量レベルが適正の場合に点灯するランプと、前記受光素子の受光量レベルが過大の場合に点灯するランプとを備える、請求項3に記載の受光量表示ユニット付き光電式分離型感知器。

【請求項6】前記受光素子の受光量調整モードを選択操作すれば、前記受光量調整モードが選択された時点における、前記受光素子の受光量に基づいて、

前記受光素子の受光量レベルが不足している場合に点灯するランプ、前記受光素子の受光量レベルが適正の場合に点灯するランプ、及び、前記受光素子の受光量レベルが過大の場合に点灯するランプのいずれかが点灯し、前記受光量調整手段を調整することにより、前記ランプのいずれかが点灯するようにされている、請求項5に記載の受光量表示ユニット付き光電式分離型感知器。

【請求項7】前記受光量表示ユニットに、更に、前記受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を設けた、請求項1～6のいずれかに記載の受光量表示ユニット付き光電式分離型感知器。

【請求項8】前記受光素子の受光量調整モードが選択操作されると、前記受光素子が、所定の時間割合で受光量レベルを計測し、前記火災監視モードが選択操作されると、前記受光素子が、上記受光量レベルの計測よりも長い時間間隔で受光量レベルを計測するようにされている、請求項3～7のいずれかに記載の受光量表示ユニット付き光電式分離型感知器。

【請求項9】前記送光器と、前記受光器とは、高所に設置され、前記受光量表示ユニットは、低所に設置されている、請求項1～8のいずれかに記載の受光量表示ユニット付き光電式分離型感知器。

【請求項10】前記受光量表示ユニットに、キーにより開け閉めが可能な蓋体を設けた、請求項1～9のいずれかに記載の受光量表示ユニット付き光電式分離型感知器。

【請求項11】発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、前記送光器と前記受光器との間の煙により、前記受光素子が受光する光の減衰を検知することで、火災の有無を判別し、火災受信機へ火災警報を発報する光電式分離型感知器に、更に、前記火災受信機に、信号線を介して、受光素子の受光レベルを表示させる受光量表示ユニットを接続し、受光量表示ユニットで、受光素子の受光量レベルを確認できるようにした、受光量表示ユニット付き光電式分離型感知器。

【請求項12】発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、前記受光素子が受光する、前記発光素子から照射された光の受光量を火災受信機へ出力し、前記火災受信機側で、前記受光素子が受光した受光量に基づいて、火災警報を発報するようにされている光電式分離型感知器において、前記火災受信機に、信号線を介して、前記受光素子の受光レベルを表示させる受光量表示ユニットを接続し、受光量表示ユニットで、受光素子の受光量レベルを確認で

きるようにした、受光量表示ユニット付き光電式分離型感知器。

【請求項 13】発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、前記送光器と前記受光器との間の煙により、前記受光素子が受光する光の減衰を検知することで、火災の有無を判別し、火災受信機へ火災警報を発報する光電式分離型感知器において、上記受光器には、信号線を介して、前記受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を有する波形確認端子ユニットを設けた、波形確認端子ユニット付き光電式分離型感知器。

【請求項 14】発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、前記受光素子が受光する、前記発光素子から照射された光の受光量を火災受信機へ出力し、前記火災受信機側で、前記受光素子が受光した受光量に基づいて、火災警報を発報するようにされている光電式分離型感知器において、上記受光器には、信号線を介して、前記受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を有する波形確認端子ユニットを設けた、波形確認端子ユニット付き光電式分離型感知器。

【請求項 15】前記送光器と、前記受光器とは、高所に設置され、前記波形確認端子ユニットは、低所に設置されている、請求項 13 又は請求項 14 に記載の波形確認端子ユニット付き光電式分離型感知器。

【請求項 16】前記波形確認端子ユニットに、キーにより開け閉めが可能な蓋体を設けた、請求項 13～15 のいずれかに記載の波形確認端子ユニット付き光電式分離型感知器。

【請求項 17】発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、前記送光器と前記受光器との間の煙により、前記受光素子が受光する、前記発光素子から照射される光の減衰を検知することで、火災の有無を判別し、火災受信機へ火災警報を発報する光電式分離型感知器において、前記火災受信機に、前記受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を有する波形確認端子ユニットを設けた、波形確認端子ユニット付き光電式分離型感知器。

【請求項 18】発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、前記受光素子が受光する、前記発光素子から照射された光の受光量を火災受信機へ出力し、前記火災受信機側で、前記受光素子が受光した受光量に基づいて、火災警報を発報するようにされている光電式分離型感知器において、前記火災受信機に、信号線を介して、前記受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を有する波形確認端子ユニットを設けた、波形確認端子ユニット付き光電式分離型感知器。

## 【発明の詳細な説明】

### 【0001】

【発明の属する技術分野】本発明は、光電式分離型感知器に関し、光電式分離型感知器の施工時やトラブル等が発生した場合に、光電式分離型感知器が取り付けられている天井等の高所に保守・点検者が登らずとも、そのトラブル等の原因を簡単に調べることができるようにした、受光量表示ユニット付き光電式分離型感知器及び波形確認端子ユニット付き光電式分離型感知器に関する。

### 【0002】

【従来の技術】近時、集合住宅やビル等の建物には、光電式分離型感知器が設置されている。図 11 は、従来の光電式分離型感知器を概略的に示す構成図である。光電式分離型感知器 101 は、図 11 に示すように、発光素子を有する送光器 102 と、受光素子を有する受光器 103 とを光軸が一致するように分離して対向配置されており、送光器 102 から間欠的にパルス光を発射して受光器 103 で受光するようにされている。受光器 103 は、信号線 W101 を介して、火災受信機 106 に接続されている。

【0003】光電式分離型感知器 101 は、火災が発生した場合には、送光器 102 と受光器 103 との間に流入した煙により、受光器 103 で受光する受光レベルが減衰するという原理を利用して、火災の有無を判別するものである。図 12 (a) に示す光電式分離型感知器 101 は、受光器 103 自体で、火災の判別を行うようにした、P 型用の光電式分離型感知器を示している。

【0004】また、図 12 (b) に示す光電式分離型感知器 101a は、感知器 101a に接続されている火災受信機 106 で、火災の判別を行うようにした、R 型用の光電式分離型感知器を示している。P 型用の光電式分離型感知器 101 は、受光器 103 内に、マイクロコンピュータ（一般には、マイコンと称される、機器組込み用として CPU 機能だけでなくメモリーやインターフェース回路等の周辺チップも含めて 1 ボード内に納めたもの）104 と、電源・発報回路 105 とを備え、マイコン 104 に、受光器 103 の受光レベルとして予めしきい値  $L_{th}$  を記憶させておき、受光器 103 が受光した受光レベル  $L$  が、しきい値  $L_{th}$  以下になると ( $L \leq L_{th}$ )、火災と判断して、電源・発報回路 105 を駆動して、火災受信機 106 に、火災警報を発報するようにされている。

【0005】また、別の R 型用の光電式分離型感知器 101a では、受光器 103 内に、マイクロコンピュータ 104 が内蔵されており、マイクロコンピュータ 104 から火災受信機 106 又は中継器（図示せず。）に、受光器 103 が受光したアナログ値を常時出力し、火災受信機 106 に、受光器 103 の受光レベルとして予めしきい値  $L_{th}$  を記憶させておき、受光器 103 が受光した受光レベル  $L$  が、しきい値  $L_{th}$  以下になると ( $L \leq$

L t h)、火災受信機106で、火災警報を発報するようにされている。

【0006】尚、図12(a)及び図12(b)中、108で示す部材装置は、受光器103の受光素子103aが受光した受光量を増幅するアンプ回路を示している。従来の光電式分離型感知器101、101aは、天井等に光電式分離型感知器101、101aを取り付けた後、ホコリが付着する等が原因して、受光器103の感度に変化するという経年変化があるので、保守・点検者が、適宜、光電式分離型感知器101、101aの清掃・検査・調整を行う必要がある。

【0007】また、受光レベル自動補正機能が付いているものにあっては、受光レベルの自動補正できなくなると、アラームを出力するので、保守・点検者は、アラームを出力した光電式分離型感知器101、101aを清掃した後、検査・調整を行っている。

【0008】

【発明が解決しようとする課題】ところで、従来の光電式分離型感知器101、101aでは、経年変化に伴う調整や、トラブルや誤報が発生した場合に、その原因を見つけるために、受光器103の側面に、受光量調整切換スイッチ(図11に示す受光量調整切換スイッチ111)を設けており、受光量調整切換スイッチ111を切り換えて、受光器103の受光量が、不足しているか、適正であるか、過大であるかの確認をしている。

【0009】また、受光器103の側面に、アンプ回路108の出力端子から導出され、アンプ回路108から出力される電圧レベル(波形)を検出するための出力端子(図示せず。)を設け、出力端子(図示せず。)にオシロスコープ等の波形計測装置(図示せず。)を接続すれば、波形計測装置により、受光器103の受光素子103aが受光し、アンプ回路108で増幅した、受光素子103aの受光レベルが適正であるか否かを調べることができるようにしているものもある。

【0010】しかしながら、受光器103は、一般に、建物の天井等の高所に取り付けられているため、光電式分離型感知器101、101aの施工時や経年変化に伴う調整やトラブルが発生した場合には、光電式分離型感知器101、101aが天井等の高所に取り付けられているため、保守・点検者は、図11に示すように、光電式分離型感知器101、101aの調整や、トラブルや誤報の原因を調べるためには、脚立やはしご等の足場を必要とし、しかも、脚立やはしごの上に登って、そのような足場の悪い状態で、保守・点検作業を行わなければならない、といった問題があった。

【0011】本発明は、以上のような問題を解決するためになされたものであって、光電式分離型感知器を施工する際や、トラブルが発生した場合に、保守・点検者は、脚立やはしご等に登ることなく、低所で、容易且つ簡単に、受光器103の受光量が、適正であるか否かを

確認でき、更には、受光器103の受光量を低所で、容易且つ簡単に、適正值に修正できるようにした、受光量表示ユニット付き光電式分離型感知器及び波形確認端子ユニット付き光電式分離型感知器を提供することを目的としている。

【0012】

【課題を解決するための手段】請求項1に記載の受光量表示ユニット付き光電式分離型感知器は、発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、送光器と受光器との間の煙により、受光素子が受光する、発光素子から照射される光の減衰を検知することで、火災の有無を判別し、火災受信機へ火災警報を発報する光電式分離型感知器に、更に、受光器に、信号線を介して、受光素子の受光レベルを表示させる受光量表示ユニットを接続し、受光量表示ユニットで、受光素子の受光量レベルを確認できるようにした。

【0013】この受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットを新たに設け、光電式分離型感知器にトラブルや誤報が発生した場合に、保守・点検者が、その原因を調べるために、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、受光素子の受光量レベルを確認できるようにしたので、容易且つ簡単に、光電式分離型感知器のトラブルや誤報の原因を知ることができる。

【0014】請求項2に記載の受光量表示ユニット付き光電式分離型感知器は、発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、受光素子が受光する、発光素子から照射された光の受光量を火災受信機へ出力し、火災受信機側で、受光素子が受光した受光量に基づいて、火災警報を発報するようにされている光電式分離型感知器に、更に、信号線を介して、受光素子の受光レベルを表示させる受光量表示ユニットを接続し、受光量表示ユニットで、受光素子の受光量レベルを確認できるようにした。

【0015】この受光量表示ユニット付き光電式分離型感知器でも、受光量表示ユニットを新たに設け、光電式分離型感知器にトラブルや誤報が発生した場合に、保守・点検者が、その原因を調べるために、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、受光素子の受光量レベルを確認できるようにしているので、容易且つ簡単に、光電式分離型感知器のトラブルや誤報の原因を知ることができる。

【0016】請求項3に記載の受光量表示ユニット付き光電式分離型感知器は、請求項1又は請求項2に記載の受光量表示ユニット付き光電式分離型感知器の受光量表示ユニットは、火災監視モードと、受光素子の受光量調整モードと、受光素子の受光量の受光量レベル表示手段と、受光素子の受光量を調整する受光量調整手段とを備え、受光素子の受光量調整モードを選択操作すれば、受光量調整モードが選択された時点における、受光素子の



受光量が、受光量レベル表示手段に表示され、受光量レベル表示手段に表示されている受光素子の受光量が適正値になるように、受光量調整手段を調整すれば、受光素子の受光量が適正になるようにされている。

【0017】この受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットに、受光量調整モードと、受光量調整手段とを設けているので、保守・点検者は、光電式分離型感知器の受光素子の受光量レベルを調整する際に、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、容易且つ簡単に、受光素子の受光量レベルを調整できる。

【0018】請求項4に記載の受光量表示ユニット付き光電式分離型感知器は、請求項3に記載の受光量表示ユニット付き光電式分離型感知器の受光量レベル表示手段が、LEDなどの複数のランプ、レベルメータ、CRT及び液晶等の表示手段のいずれかである。受光量表示ユニットとしては、保守・点検者に、受光素子の受光量レベルが容易に判る表示手段であれば、何でも使用できる。

【0019】したがって、受光素子の受光量レベルを表示する受光量レベル表示手段として、複数のランプ、レベルメータ、CRT及び液晶等を用いることで、商品のバリエーションを広げることができ、これにより、多様化した顧客のニーズにあった商品を市場に供給できるようになる。請求項5に記載の受光量表示ユニット付き光電式分離型感知器は、請求項3に記載の受光量表示ユニット付き光電式分離型感知器の、受光量表示ユニットの受光量レベル表示手段が、受光素子の受光量レベルが不足している場合に点灯するランプと、受光素子の受光量レベルが適正の場合に点灯するランプと、受光素子の受光量レベルが過大の場合に点灯するランプとを備える。

【0020】この受光量表示ユニット付き光電式分離型感知器では、受光量調整モードが選択された場合に限り、複数のランプのいずれかが点灯するようにし、火災監視モードが選択されている場合には、複数のランプのいずれもが点灯しないようにしている。これにより、火災監視モードが選択されている場合の消費電流を低く抑えることができ、一つの供給電源に対し、沢山の受光量表示ユニット付き光電式分離型感知器を接続することも可能になる。

【0021】また、この受光量表示ユニット付き光電式分離型感知器では、受光素子の受光量レベルを表示する表示手段として、ランプを選択しているため、受光素子の受光量レベルが視覚的に判りやすい。しかも、ランプは、LEDを使用すれば安価であるため、安価な、受光量表示ユニット付き光電式分離型感知器を市場に供給できる。

【0022】請求項6に記載の受光量表示ユニット付き光電式分離型感知器は、請求項5に記載の受光量表示ユニット付き光電式分離型感知器の、受光素子の受光量調

整モードを選択操作すれば、受光量調整モードが選択された時点における、受光素子の受光量に基づいて、受光素子の受光量レベルが不足している場合に点灯するランプ、受光素子の受光量レベルが適正の場合に点灯するランプ及び、受光素子の受光量レベルが過大の場合に点灯するランプのいずれかが点灯し、受光量調整手段を調整することにより、これらのランプのいずれかが点灯するようにされている。

【0023】これにより、保守・点検者は、受光量調整モードを選択すれば、これらのランプの点灯状態を見ながら、受光素子の受光量レベルが適正の場合に点灯するランプが点灯するように、受光量調整手段を調整するという簡単な操作で、受光器の受光素子の受光量レベルを適正値に調整することができる。請求項7に記載の受光量表示ユニット付き光電式分離型感知器は、請求項1～6のいずれかに記載の受光量表示ユニット付き光電式分離型感知器の受光量表示ユニットに、更に、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を設けた。

【0024】この受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットに、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を設けたので、保守・点検者は、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットに設けられた、波形確認端子に、オシロスコープ等の波形表示装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0025】請求項8に記載の受光量表示ユニット付き光電式分離型感知器は、請求項3～7のいずれかに記載の受光量表示ユニット付き光電式分離型感知器において、受光素子の受光量調整モードにおける受光量レベルの計測の時間的な割合が、火災監視モードにおける受光量レベルの計測の時間的な割合よりも短く設定されている。望ましい例では、受光量調整モードでは、受光素子が、1秒に1回の割合で、受光量レベルが計測され、火災監視モードでは、受光素子が、5秒に1回の割合で、受光量レベルを計測される。

【0026】この受光量表示ユニット付き光電式分離型感知器では、受光量調整モードが選択操作されると、受光素子が、監視モードの場合よりも短い時間割合で受光量レベルが計測されるようにしているため、短時間に沢山の情報に基づいて、受光素子の受光量レベルを知ることができる。また、火災監視モードが選択されている場合には、火災を確実に検出できる最小限の割合、即ち、1秒に1回の割合で、受光量レベルを計測することができ、火災監視モードが選択されている場合の消費電流を低く抑えることができる。これにより、一つの供給電源に対し、沢山の受光量表示ユニット付き光電式分離型感知器を接続することも可能になる。

【0027】請求項9に記載の受光量表示ユニット付き光電式分離型感知器は、請求項1～8のいずれかに記載の受光量表示ユニット付き光電式分離型感知器の、送光器と、受光器とは、高所に設置され、受光量表示ユニットは、低所に設置されている。ここに、本明細書で用いる用語、「低所」とは、脚立やはしご等の足場に登らずとも、人が普通に立った状態で、容易に、目で見たり、手指で作業が行えるような、通常的生活空間を意味する。

【0028】この受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットは、低所に設置しているので、光電式分離型感知器にトラブルや誤報が発生した場合に、保守・点検者が、その原因を調べるために、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、受光素子の受光量レベルを確認できるので、容易且つ簡単に、光電式分離型感知器のトラブルや誤報の原因を知ることができる。

【0029】請求項10に記載の受光量表示ユニット付き光電式分離型感知器は、請求項1～9のいずれかに記載の受光量表示ユニット付き光電式分離型感知器の、受光量表示ユニットに、キーにより開け閉めが可能な蓋体を設けた。受光量表示ユニットを低所に設けた場合には、保守・点検者等以外の一般人が、受光量表示ユニット内に設けられたスイッチ手段等に触れてしまうという虞れがあるが、この受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットに、キーにより開け閉めが可能な蓋体を設けているので、キーを持っていない一般人は、蓋体を開けることができない。これにより、一般人が、受光量表示ユニット内に設けられたスイッチ手段等に触れてしまうという事故が生じない。

【0030】請求項11に記載の受光量表示ユニット付き光電式分離型感知器は、発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、送光器と受光器との間の煙により、受光素子が受光する、発光素子から照射される光の減衰を検知することで、火災の有無を判別し、火災受信機へ火災警報を発報する光電式分離型感知器に、更に、火災受信機に、信号線を介して、受光素子の受光レベルを表示させる受光量表示ユニットを接続し、受光量表示ユニットで、受光素子の受光量レベルを確認できるようにした。

【0031】この受光量表示ユニット付き光電式分離型感知器では、火災受信機に受光量表示ユニットを設けているので、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機が設置されている、例えば、管理人室等にながら、受光素子の受光量レベルを確認できる。請求項12に記載の受光量表示ユニット付き光電式分離型感知器は、発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、受光素子が受光する、発光素子から照射された光の受光量を火災受信機へ出力し、火災受信機側

で、受光素子が受光した受光量に基づいて、火災警報を発報するようにされている光電式分離型感知器に、更に、火災受信機に、信号線を介して、受光素子の受光レベルを表示させる受光量表示ユニットを接続し、受光量表示ユニットで、受光素子の受光量レベルを確認できるようにした。

【0032】この受光量表示ユニット付き光電式分離型感知器でも、火災受信機に受光量表示ユニットを設けているので、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機が設置されている、例えば、管理人室等にながら、受光素子の受光量レベルを確認できる。請求項13に記載の波形確認端子ユニット付き光電式分離型感知器は、発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、送光器と受光器との間の煙により、受光素子が受光する、発光素子から照射される光の減衰を検知することで、火災の有無を判別し、火災受信機へ火災警報を発報する光電式分離型感知器に、更に、信号線を介して、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を有する波形確認端子ユニットを設けた。

【0033】この波形確認端子ユニット付き光電式分離型感知器では、波形確認端子ユニットに、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を設けたので、保守・点検者は、わざわざ、感知器の取り付けられている所まで登っていかずとも、波形確認端子ユニットに設けられた、波形確認端子に、オシロスコープ等の波形計測装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0034】請求項14に記載の波形確認端子ユニット付き光電式分離型感知器は、発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、受光素子が受光する、発光素子から照射された光の受光量を火災受信機へ出力し、火災受信機側で、受光素子が受光した受光量に基づいて、火災警報を発報するようにされている光電式分離型感知器に、更に、信号線を介して、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を有する波形確認端子ユニットを設けた。

【0035】この波形確認端子ユニット付き光電式分離型感知器でも、波形確認端子ユニットに、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を設けたので、保守・点検者は、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットに設けられた、波形確認端子に、オシロスコープ等の波形表示装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0036】請求項15に記載の波形確認端子ユニット付き光電式分離型感知器は、請求項13又は請求項14

に記載の波形確認端子ユニット付き光電式分離型感知器の、送光器と、受光器とは、高所に設置され、波形確認端子ユニットは、低所に設置されている。この波形確認端子ユニット付き光電式分離型感知器では、受光量表示ユニットは、低所に設置しているので、光電式分離型感知器にトラブルや誤報が発生した場合に、保守・点検者が、その原因を調べるために、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、受光素子の受光量レベルを確認できるので、容易且つ簡単に、光電式分離型感知器のトラブルや誤報の原因を知ることができる。

【0037】請求項16に記載の波形確認端子ユニット付き光電式分離型感知器は、請求項13～15のいずれかに記載の波形確認端子ユニット付き光電式分離型感知器の、受光量表示ユニットに、キーにより開け閉めが可能な蓋体を設けた。波形確認端子ユニットを低所に設けた場合には、保守・点検者等以外の一般人が、波形確認端子ユニット内に設けられた波形確認端子に、何等かの電気製品を接続するという虞れがあるが、この波形確認端子ユニット付き光電式分離型感知器では、波形確認端子ユニットに、キーにより開け閉めが可能な蓋体を設けているので、キーを持っていない一般人は、蓋体を開けることができない。これにより、一般人が、波形確認端子ユニット内に設けられた波形確認端子に、何等かの電気製品を接続してしまうという事故が生じない。

【0038】請求項17に記載の波形確認端子付き光電式分離型感知器は、発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、送光器と受光器との間の煙により、受光素子が受光する、発光素子から照射される光の減衰を検知することで、火災の有無を判別し、火災受信機へ火災警報を発報する光電式分離型感知器に、更に、火災受信機に、信号線を介して、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を有する波形確認端子ユニットを設けた。

【0039】この波形確認端子ユニット付き光電式分離型感知器では、火災受信機に波形確認端子ユニットを設けているので、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機が設置されている、例えば、管理人室等にながら、波形確認端子ユニットの波形確認端子に、オシロスコープ等の波形表示装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0040】請求項18に記載の波形確認端子付き光電式分離型感知器は、発光素子を有する送光器と、受光素子を有する受光器とが分離して配置され、受光素子が受光する、発光素子から照射された光の受光量を火災受信機へ出力し、火災受信機側で、受光素子が受光した受光量に基づいて、火災警報を発報するようにされている光電式分離型感知器に、更に、火災受信機に、信号線を介

して、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を有する波形確認端子ユニットを設けた。

【0041】この波形確認端子ユニット付き光電式分離型感知器でも、火災受信機に波形確認端子ユニットを設けているので、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機が設置されている、例えば、管理人室等にながら、波形確認端子ユニットの波形確認端子に、オシロスコープ等の波形表示装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0042】

【発明の実施の形態】以下、本発明に係る受光量表示ユニット付き光電式分離型感知器と、本発明に係る波形確認端子ユニット付き光電式分離型感知器について、図面を参照しながら、更に詳しく説明する。

（発明の実施の形態1）発明の実施の形態1では、本発明に係る受光量表示ユニット付き光電式分離型感知器について説明する。

【0043】図1は、本発明に係る受光量表示ユニット付き光電式分離型感知器の一例を概略的に示す構成図である。まず、光電式分離型感知器として、P型用の光電式分離型感知器を用いた場合を例にして説明する。この感知器1は、図1に示すように、発光素子を有する送光器2と、受光素子3aを有する受光器3とを光軸が一致するように分離して対向配置されており、送光器2から間欠的にパルス光を発射して受光器3で受光するようにされている。受光器3は、信号線W1を介して、火災受信機6に接続されている。

【0044】以上の構成は、図11に示す、従来の光電式分離型感知器101と同様であるが、この感知器1には、新たに、信号線W2を介して、受光量表示ユニット11が設けられている。受光量表示ユニット11は、床面から人が作業するのに適した高さ（低所）に設けられている。

【0045】この例では、信号線W2は、マイクロコンピュータ4の出力端子に接続されており、受光量表示ユニット11には、マイクロコンピュータ4により、所定の処理方法によりデジタル化された、受光素子3aの受光量が出力されるようになっている。図2(a)は、本発明に係る受光量表示ユニット付き光電式分離型感知器の概略的なブロック図である。

【0046】この受光量表示ユニット付き光電式分離型感知器1は、受光器3内には、受光素子3aの他に、マイクロコンピュータ4と、電源・発報回路5とを備える。マイクロコンピュータ4には、受光器3の受光レベルとして予めしきい値 $L_{th}$ が記憶されている。そして、受光器3の受光素子3aが受光した受光レベル $L$ が、しきい値 $L_{th}$ 以下になると（ $L \leq L_{th}$ ）、火災

と判断して、電源・発報回路5を駆動して、火災受信機6に、火災警報を発報するようにされている。

【0047】尚、図2(a)中、8で示す部材装置は、受光器3の受光素子が受光した受光量を増幅するアンプ回路を示しており、このアンプ回路8は、後述する受光量調整手段(図3に示す受光量調整手段14)により、その利得が変えられるようになっている。次に、受光量表示ユニット11の構成について説明する。

【0048】図3は、受光量表示ユニット11を概略的に示す構成図である。受光量表示ユニット11は、キー(図示せず。)により開け閉めが可能な蓋体11aと、ユニット本体11bとを備える。尚、図3中、11cで示す部材は、鍵穴を、また、11dで示す部材は、キー(図示せず。)の操作により、鍵穴11cに施錠解除できるようになっている鍵部材を示している。

【0049】ユニット本体11bには、受光量レベル表示手段12と、この光電式分離型感知器1aを、火災監視モードと、受光素子の受光量調整モードとに切り換える、モード切換スイッチ13と、受光量調整手段14とを備える。この例では、受光量レベル表示手段12として、複数(この例では、3個)のLED12a、12b、12cを用いている。

【0050】複数のLED12a、12b、12cは、モード切換スイッチ13が、火災監視モード側に設定されている時には、いずれもが点灯しないようにされている。尚、この例では、モード切換スイッチ13が、火災監視モード側に設定されている時には、送光器2の発光素子が、5秒に1回の割合で、間欠的にパルス光が発射され、受光器3の受光素子が、5秒に1回の割合で、受光量レベルを計測するようにされている。

【0051】一方、モード切換スイッチ13が、受光素子の受光量調整モード側に設定される時には、受光量調整モードが選択された時点における、前記受光素子の受光量に基づいて、複数のLED12a、12b、12cのいずれかが点灯するようにされている。この例では、LED12aは、受光器3の受光素子の受光量レベルが不足している場合に点灯するようにされている。

【0052】LED12bは、受光器3の受光素子の受光量レベルが適正の場合に点灯するようにされている。また、LED12cは、受光器3の受光素子の受光量レベルが過大の場合に点灯するようにされている。より詳しく説明すると、この光電式分離型感知器1aでは、マイコン4に、しきい値Lthより大きい値の2つの受光量レベル判別用しきい値Ldth、Lbthが予め記憶されている。

【0053】この感知器1では、受光器3の受光素子の受光量レベルのアナログ値Laが、受光量レベル判別用しきい値Ldthと受光量レベル判別用しきい値Lbthとの間( $Ldth \leq La \leq Lbth$ )にあれば、受光器3の受光素子の受光量レベルが適正とされ、この場合

には、LED12bのみが点灯するようにされている。

【0054】また、例えば、送光器2のレンズ部分(図示せず。)や、受光器3の光透過窓(図示せず。)等の汚れが原因して、受光器3の受光素子3aの受光量が経年的に低下してくる。そして、受光器3の受光素子3aの受光量のアナログ値Laが、受光量レベル判別用しきい値Ldth未満( $La < Ldth$ )になると、LED12aのみが点灯するようにされている。

【0055】また、送光器2と受光器3との間の間隔が短い場合のように、受光器3の受光素子3aの受光量のアナログ値Laが、明るくて、火災が発生して、送光器2と受光器3との間に煙が流入しても、受光器3の受光素子3aの受光量レベルが、しきい値Lbthにならないような、受光量レベル判別用しきい値Lbthを超えた場合( $La > Lbth$ )には、LED12cのみが点灯するようにされている。

【0056】尚、この例では、モード切換スイッチ13が、受光量調整モード側に設定されている時には、送光器2の発光素子が、1秒に1回の割合で、間欠的にパルス光が発射され、受光器3の受光素子3aが、1秒に1回の割合で、受光量レベルを計測するようにされている。更に、この感知器1aでは、受光量調整手段14が、スライド式又はダイヤル式等の無段階調整スイッチで構成されており、受光量調整手段14を調整することで、受光器3の受光素子3aの受光量レベルのアナログ値Laが、受光量レベル判別用しきい値Ldthと受光量レベル判別用しきい値Lbthとの間( $Ldth \leq La \leq Lbth$ )になれば、LED12bが点灯し、受光器3の受光素子の受光量レベルのアナログ値Laが、受光量レベル判別用しきい値Ldth未満( $La < Ldth$ )になると、LED12aが点灯するようにされており、また、受光量レベル判別用しきい値Lbthを超えた場合( $La > Lbth$ )には、LED12cが点灯するようにされている。

【0057】これにより、保守・点検者は、モード切換スイッチ13を受光量調整モード側にすれば、複数のLED12a、12b、12cの点灯状態を見ながら、LED12bが点灯するように、受光量調整手段14を調整するだけで、受光器3の受光素子3aの受光量レベルを適正值( $Ldth \leq La \leq Lbth$ )に調整することができる。

【0058】尚、この感知器1では、受光量調整手段14を調整すれば、アンプ回路8の利得を変えることができるようになっている。次に、この受光量表示ユニット付き光電式分離型感知器1が施工時に実施される初期設定作業や、メンテナンス作業について説明する。

初期設定作業

まず、天井に、送光器2と受光器3とを所定の間隔を隔てて取り付ける。

【0059】また、受光量表示ユニット11は、床面か

ら人が作業するのに適した高さ（低所）に取り付ける。次に、受光量表示ユニット11の蓋体11aをキーを用いて開き、モード切換スイッチ13を、受光量調整モード側に設定する。すると、受光量表示ユニット本体11bに設けられた複数のLED12a、12b、12cのいずれかが点灯するので、送光器2と受光器3との間に、煙が介在していないことを確認した上で、必要により、受光量調整手段14を調整操作して、LED12bが点灯するようにする。

【0060】LED12bが点灯したら、モード切換スイッチ13を監視モードに切り換える。その後、蓋体11aを閉じる。

#### メンテナンス作業

以下、感知器1に、受光レベル補正機能が付いていない場合には、保守・点検者が、適宜、受光量表示ユニット11の蓋体11aをキーを用いて開き、モード切換スイッチ13を、受光量調整モード側に設定し、送光器2と受光器3との間に、煙が介在していないことを確認した上で、必要により、受光量調整手段14を調整操作して、LED12bが点灯するようにし、LED12bが点灯したら、モード切換スイッチ13を監視モードに切り換えた後、蓋体11aを閉じるという点検作業を行う。

【0061】また、感知器1に、受光レベル自動補正機能が付いている場合には、光電式分離型感知器1aが、受光レベルの自動補正できなくなると、アラームを出力するので、保守・点検者は、アラームを出力した光電式分離型感知器1aを清掃した後、受光量表示ユニット11の蓋体11aをキーを用いて開き、モード切換スイッチ13を、受光量調整モード側に設定し、送光器2と受光器3との間に、煙が介在していないことを確認した上で、必要により、受光量調整手段14を調整操作して、LED12bが点灯するようにし、LED12bが点灯したら、モード切換スイッチ13を監視モードに切り換えた後、蓋体11aを閉じるという点検作業を行う。

【0062】次に、本発明に係る受光量表示ユニット付き光電式分離型感知器の他の一例について、R型用の光電式分離型感知器を用いた場合を例にして説明する。図2(b)に示す受光量表示ユニット付き光電式分離型感知器1aは、感知器1aに接続されている火災受信機6で、火災の判別を行うようにしている。この感知器1aは、感知器1とは、以下の構成を除けば、感知器1と同様の構成であるので、相当する部材装置には相当する参照符号を付して、その説明を省略する。

【0063】この感知器1aは、受光器3内に、電源・発報回路5を有しておらず、また、マイクロコンピュータ4には、火災か否かを判断するしきい値 $L_{th}$ が記憶されておらず、マイクロコンピュータ4からは、火災受信機6又は中継器（図示せず。）に、受光器3が受光したアナログ値が常時出力されるようになっており、火災

受信機6に、受光器3の受光レベルとして予めしきい値 $L_{th}$ を記憶させておき、受光器3が受光した受光レベル $L$ が、しきい値 $L_{th}$ 以下になると（ $L \leq L_{th}$ ）、火災受信機6で、火災警報を発報するようにされている。

【0064】尚、この感知器1aの初期設定作業やメンテナンス作業は、感知器1と同様であるので、ここでの説明は省略する。受光量表示ユニット付き光電式分離型感知器1、1aでは、受光量表示ユニット11を新たに設け、光電式分離型感知器1、1aの経年変化に伴う調整が必要な場合や、光電式分離型感知器1、1aにトラブルや誤報が発生した場合に、保守・点検者が、その原因を調べるために、わざわざ、従来のように感知器101、101aが取り付けられている所まで登っていかずとも、図1に示すように、床に立った状態で、受光量表示ユニット11側で、受光素子3aの受光量レベルを確認できるようにしたので、容易且つ簡単に、光電式分離型感知器1、1aのトラブルや誤報の原因を知ることができる。

【0065】また、受光量表示ユニット11に、受光量調整モードと、受光量調整手段14とを設けている。これにより、保守・点検者は、光電式分離型感知器1の受光素子3aの受光量レベルを調整する際に、わざわざ、従来の感知器101のように、感知器101、101aが取り付けられている高所まで登っていかずとも、受光量表示ユニット11で、容易且つ簡単に、受光素子3aの受光量レベルを調整できる。

【0066】更に、モード切換スイッチ13により、受光量調整モードが選択された場合に限り、複数のLED12a、12b、12cのいずれかが点灯するようにし、火災監視モードが選択されている場合には、複数のLED12a、12b、12cのいずれもが点灯しないようにしている。これにより、火災監視モードが選択されている場合の消費電流を低く抑えることができ、一つの供給電源に対し、沢山の受光量表示ユニット付き光電式分離型感知器1、1aを接続することも可能になる。

【0067】また、モード切換スイッチ13により、受光量調整モードを選択操作すれば、受光量調整モードが選択された時点における、受光素子3aの受光量に基づいて、受光素子3aの受光量レベルが不足している場合に点灯するLED12a、受光素子3aの受光量レベルが適正の場合に点灯するLED12b、及び、受光素子3aの受光量レベルが過大の場合に点灯するLED12cのいずれかが点灯し、受光量調整手段14を調整すれば、アンプ回路8の利得が変わり、受光量調整手段14の調整状態に応じて、受光素子3aの受光量レベルが不足している場合に点灯するLED12a、受光素子3aの受光量レベルが適正の場合に点灯するLED12b、及び、受光素子3aの受光量レベルが過大の場合に点灯するLED12cのいずれかが点灯するようにされている。



る。

【0068】これにより、保守・点検者は、受光量調整モードを選択すれば、これらのLED12a、12b、12cの点灯状態を見ながら、受光素子3aの受光量レベルが適正の場合に点灯するLED12bが点灯するように、受光量調整手段14を調整するという簡単な操作で、受光器3の受光素子3aの受光量レベルを適正値に調整することができる。

【0069】また、この受光量表示ユニット付き光電式分離型感知器1、1aでは、受光素子3aの受光量レベルを表示する表示手段として、LED12a、12b、12cを選択しているの、受光素子3aの受光量レベルが視覚的に判りやすい。しかも、LED12a、12b、12cは、安価であるので、安価な、受光量表示ユニット付き光電式分離型感知器1を市場に供給できる。

(発明の実施の形態2) 発明の実施の形態2では、本発明に係る波形確認端子ユニット付き光電式分離型感知器について説明する。

【0070】図4(a)は、本発明に係る波形確認端子ユニット付き光電式分離型感知器を概略的に示すブロック図である。この感知器1cは、図4(a)に示すように、発光素子を有する送光器2と、受光素子3aを有する受光器3とを光軸が一致するように分離して対向配置されており、送光器2から間欠的にパルス光を放射して受光器3で受光するようにされている。受光器3は、信号線W1を介して、火災受信機6に接続されている。

【0071】受光素子3aには、アンプ回路8が接続され、受光素子3aが受光した受光量は、アンプ回路8により増幅されて、マイクロコンピュータ4に入力するようになっている。マイクロコンピュータ4には、電源・発報回路5が接続されている。また、マイクロコンピュータ4には、受光器3の受光レベルとして予めしきい値Lthが記憶されている。そして、受光器3の受光素子3aが受光した受光レベルLが、しきい値Lth以下になると( $L \leq Lth$ )、火災と判断して、電源・発報回路5を駆動して、火災受信機6に、火災警報を発報するようにされている。

【0072】以上の構成は、図1に示す、感知器1と同様であるが、この感知器1cには、信号線W3、W4を介して、波形確認端子ユニット21が設けられている。波形確認端子ユニット21は、受光量表示ユニット付き光電式分離型感知器1の受光量表示ユニット11と同様、低所に設けられている。また、マイクロコンピュータ4には、受光レベル自動補正プログラムが記憶されており、この感知器1cは、受光レベルの自動補正できなくなると、アラームを出力するようになっている。

【0073】次に、波形確認端子ユニット21の構成について説明する。図5は、波形確認端子ユニット21を概略的に示す構成図である。波形確認端子ユニット21は、キー(図示せず。)により開け閉めが可能な

蓋体21aと、ユニット本体21bとを備える。尚、図5中、21cで示す部材は、鍵穴を、また、21dで示す部材は、キー(図示せず。)の差し込み口を示している。

【0074】ユニット本体21bには、オシロスコープ等の波形計測装置(図示せず。)を接続するための出力端子22、23と、グランド線接続用端子24とが設けられている。出力端子22は、アンプ回路8の出力端子から導出された信号線W3に接続され、受光素子3aが受光し、アンプ回路8により増幅された受光素子3aの受光量がアナログ値として、そのまま出力されるようになっている。

【0075】従って、出力端子22に、オシロスコープ等の波形計測装置(図示せず。)を接続すれば、受光レベル自動補正プログラムで処理される前の、汚れ補正がされていない、受光素子3aの受光量の電圧レベル(波形)を検出することができるようになっている。一方、出力端子23は、マイクロコンピュータ4の出力端子から導出された信号線W4に接続され、受光素子3aが受光し、アンプ回路8により増幅され、マイクロコンピュータ4に記憶された受光レベル自動補正プログラムで処理された後の、汚れ補正がされたデジタル量が、出力されるようになっている。

【0076】従って、出力端子23に、オシロスコープ等の波形計測装置(図示せず。)を接続すれば、受光レベル自動補正プログラムで処理された後の、汚れ補正がされた、受光素子3aの補正受光量を検出することができるようになっている。尚、この例では、マイクロコンピュータ4には、受光レベル自動補正プログラムとして、3秒間隔で、投光器2の発光素子を発光し、3秒毎にサンプリングした受光器3の受光素子3aの受光量を1日分蓄積し、その平均値をゼロレベルに順次補正するというプログラムが記憶されている。

【0077】次に、本発明に係る波形確認端子ユニット付き光電式分離型感知器の他の一例について、R型用の光電式分離型感知器を用いた場合を例にして説明する。図4(b)に示す波形確認端子ユニット付き光電式分離型感知器1dは、感知器1dに接続されている火災受信機6で、火災の判別を行うようにしている。この感知器1dは、感知器1cとは、以下の構成を除けば、感知器1cと同様の構成であるので、相当する部材装置には相当する参照符号を付して、その説明を省略する。

【0078】この感知器1dは、受光器3内に、電源・発報回路5を有しておらず、また、マイクロコンピュータ4には、火災か否かを判断するしきい値Lthが記憶されておらず、マイクロコンピュータ4からは、火災受信機6又は中継器(図示せず。)に、受光器3が受光したアナログ値が常時出力されるようになっており、火災受信機6に、受光器3の受光レベルとして予めしきい値Lthを記憶させておき、受光器3が受光した受光レベ

ル $L$ が、しきい値 $L_{th}$ 以下になると( $L \leq L_{th}$ )、火災受信機6で、火災警報を発報するようにされている。

【0079】波形確認端子ユニット付き光電式分離型感知器1c、1dでは、波形確認端子ユニット21に、受光素子3aが受光した受光量に基づく電圧変動を検出する波形確認端子22、23を設けたので、保守・点検者は、従来の感知器101のように、わざわざ、感知器101の取り付けられている所まで登っていかずとも、受光量表示ユニット21に設けられた、波形確認端子22、23に、オシロスコープ等の波形表示装置(図示せず。)を接続するだけで、受光素子3aの受光量の正確な波形(電圧波形等)を、容易且つ簡単に、知ることができる。

【0080】より詳しく説明すると、保守・点検者は、波形確認端子22とグランド線接続用端子24とに、オシロスコープ等の波形表示装置(図示せず。)を接続するだけで、従来の感知器101のように、わざわざ、感知器101の取り付けられている所まで登っていかずとも、受光素子3aが受光し、アンプ回路8により増幅された受光素子3aの受光量を、アナログ値として、正確な波形(電圧波形等)を、容易且つ簡単に、知ることができる。また、波形確認端子23とグランド線接続用端子24とに、オシロスコープ等の波形表示装置(図示せず。)を接続するだけで、受光レベル自動補正プログラムで処理された後の、汚れ補正がされた、受光素子3aの補正受光量(デジタル量)を、容易且つ簡単に、知ることができる。

【0081】尚、この例では、出力端子22が、アンプ回路8の出力端子から導出された信号線W3に接続され、出力端子23が、マイクロコンピュータ4の出力端子から導出された信号線W4に接続された例について説明したが、マイクロコンピュータ4の出力端子に、信号線W3、W4を接続し、マイクロコンピュータ4内で、信号線W3よりアナログ値が、信号線W4より補正受光量(デジタル量)が出力されるようにしてもよい。

【0082】以上、発明の実施の形態1では、本発明に係る受光量表示ユニット付き光電式分離型感知器の例について説明し、また、発明の実施の形態2では、本発明に係る波形確認端子ユニット付き光電式分離型感知器の例について説明したが、種々の変形例がある。図6及び図7に示す受光量表示ユニット付き光電式分離型感知器1eは、受光量表示ユニット31に、受光量レベル表示手段12、モード切換スイッチ13と、受光量調整手段14、波形確認端子22、23及びグランド線接続用端子24を設けている。

【0083】受光量表示ユニット付き光電式分離型感知器1eのように、受光量表示ユニット31に、受光量レベル表示手段12、モード切換スイッチ13と、受光量調整手段14、波形確認端子22、23及びグランド線

接続用端子24を設けた場合には、保守・点検者は、光電式分離型感知器の受光器3に設けられた受光素子3aの受光量レベルを調整する際に、わざわざ、受光器3の取り付けられている所まで登っていかずとも、受光量表示ユニット31で、容易且つ簡単に、受光素子3aの受光量レベルを確認したり、調整したり、更には、波形確認端子22、23に、オシロスコープ等の波形計測装置を接続するだけで、受光素子3aの受光量の正確な波形(電圧波形等)を、容易且つ簡単に、知ることができる。

【0084】また、図8(a)及び図8(b)の各々に示す受光量表示ユニット付き光電式分離型感知器1f、1gは、受光量表示ユニット11を、火災受信機6に設けた例を示している。受光量表示ユニット付き光電式分離型感知器1f、1gのように、火災受信機6に受光量表示ユニット11を設けた場合には、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機6が設置されている、例えば、管理入室等にながら、受光素子3aの受光量レベルを確認したり、調整したりすることができる。

【0085】また、図9(a)及び図9(b)の各々に示す波形確認端子ユニット付き光電式分離型感知器1h、1iは、波形確認端子ユニット21を、火災受信機6に設けた例を示している。波形確認端子ユニット付き光電式分離型感知器1h、1iのように、火災受信機6に波形確認端子ユニット21を設けた場合には、保守・点検者は、光電式分離型感知器の投光器2及び受光器3が設置されている現場にいかずとも、火災受信機6が設置されている、例えば、管理入室等にながら、波形確認端子22、23に、オシロスコープ等の波形計測装置を接続するだけで、受光素子3aの受光量の正確な波形(電圧波形等)を、容易且つ簡単に、知ることができる。

【0086】更にまた、図10(a)及び図10(b)の各々に示す波形確認端子ユニット付き光電式分離型感知器1j、1kは、受光量表示ユニット31を、火災受信機6に設けた例を示している。波形確認端子ユニット付き光電式分離型感知器1j、1kのように、火災受信機6に受光量表示ユニット31を設けた場合には、保守・点検者は、光電式分離型感知器2、3が設置されている現場にいかずとも、火災受信機6が設置されている、例えば、管理入室等にながら、受光素子3aの受光量レベルを確認したり、調整したりすることができ、且つ、波形確認端子22、23に、オシロスコープ等の波形計測装置を接続するだけで、受光素子3aの受光量の正確な波形(電圧波形等)を、容易且つ簡単に、知ることができる。

【0087】更にまた、この発明の実施の形態では、受光量表示ユニット付き光電式分離型感知器1、1a、1e、1f、1g、1j、1kとして、受光量表示ユニッ

ト11、21、31の受光量レベル表示手段12として、複数のLED12a、12b、12cを設けた例について説明したが、これは、単に好ましい例を説明したに過ぎず、受光量レベル表示手段12は、視認性に優れている限り、種々の表示手段を用いることができ、そのような受光量レベル表示手段12としては、例えば、レベルメータ、CRT及び液晶等を用いることもできる。そして、受光素子3aの受光量レベルを表示する受光量レベル表示手段12として、複数のLED、レベルメータ、CRT及び液晶等を用いれば、商品のバリエーションを広げることができ、これにより、多様化した顧客のニーズにあった商品を市場に供給できるようになる。

#### 【0088】

【発明の効果】以上、詳細に説明したように、請求項1、2に記載の受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットを新たに設けているので、光電式分離型感知器を施工した際やトラブル発生した場合に、保守・点検者が、その原因を調べるために、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、受光素子の受光量レベルを確認できる。したがって、容易且つ簡単に、光電式分離型感知器のトラブルや誤報の原因を知ることができる。

【0089】請求項3に記載の受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットに、受光量調整モードと、受光量調整手段とを設けている。したがって、保守・点検者は、光電式分離型感知器の受光素子の受光量レベルを調整する際に、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、容易且つ簡単に、受光素子の受光量レベルを調整できる。

【0090】請求項4に記載の受光量表示ユニット付き光電式分離型感知器では、受光量レベル表示手段として、種々表示手段を用いることができるので、受光素子の受光量レベルを表示する受光量レベル表示手段として、複数のランプ、レベルメータ、CRT及び液晶等を用いることで、商品のバリエーションを広げることができ、これにより、多様化した顧客のニーズにあった商品を市場に供給できるようになる。

【0091】請求項5に記載の受光量表示ユニット付き光電式分離型感知器では、受光量調整モードが選択された場合に限り、複数のランプのいずれかが点灯するようにし、火災監視モードが選択されている場合には、複数のランプのいずれもが点灯しないようにしている。これにより、火災監視モードが選択されている場合の消費電流を低く抑えることができ、一つの供給電源に対し、沢山の受光量表示ユニット付き光電式分離型感知器を接続することも可能になる。

【0092】また、この受光量表示ユニット付き光電式分離型感知器では、受光素子の受光量レベルを表示する

表示手段として、ランプを選択しているため、受光素子の受光量レベルが視覚的に判りやすい。特にLEDを選択する場合には、安価であるので、安価な、受光量表示ユニット付き光電式分離型感知器を市場に供給できる。

【0093】請求項6に記載の受光量表示ユニット付き光電式分離型感知器では、保守・点検者は、受光量調整モードを選択すれば、これらのランプの点灯状態を見ながら、受光素子の受光量レベルが適正の場合に点灯するランプが点灯するように、受光量調整手段を調整することができるので、受光器の受光素子の受光量レベルを適正値に容易且つ簡単に調整することができる。

【0094】請求項7に記載の受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットに、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を設けたので、保守・点検者は、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットに設けられた、波形確認端子に、オシロスコープ等の波形表示装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0095】請求項8に記載の受光量表示ユニット付き光電式分離型感知器では、受光量調整モードにおける受光素子の受光量レベルの計測に対する時間割合を、火災監視モードにおける受光素子の受光量レベルの計測に対する時間割合よりも短く設定しているので、受光量調整モードでは、火災監視モードよりも短時間に沢山の情報に基づいて、受光素子の受光量レベルを知ることができる。

【0096】また、火災監視モードが選択されている場合には、火災を確実に検出できる最小限の割合で、受光量レベルが計測すれば、消費電流を低く抑えることができる。これにより、一つの供給電源に対し、沢山の受光量表示ユニット付き光電式分離型感知器を接続することも可能になる。請求項9に記載の受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットは、低所に設置しているので、光電式分離型感知器の施工時や、トラブルが発生した場合に、保守・点検者が、その原因を調べるために、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、受光素子の受光量レベルを確認できるので、容易且つ簡単に、光電式分離型感知器のトラブルや誤報の原因を知ることができる。

【0097】請求項10に記載の受光量表示ユニット付き光電式分離型感知器では、受光量表示ユニットに、キーにより開け閉めが可能な蓋体を設けているので、キーを持っていない一般人は、蓋体を開けることができない。これにより、一般人が、受光量表示ユニット内に設けられたスイッチ手段等に触れてしまうという事故が生じない。

【0098】請求項11に記載の受光量表示ユニット付



き光電式分離型感知器では、火災受信機に受光量表示ユニットを設けているので、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機が設置されている、例えば、管理人室等にながら、受光素子の受光量レベルを確認できる。請求項12に記載の受光量表示ユニット付き光電式分離型感知器でも、火災受信機に受光量表示ユニットを設けているので、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機が設置されている、例えば、管理人室等にながら、受光素子の受光量レベルを確認できる。

【0099】請求項13に記載の波形確認端子ユニット付き光電式分離型感知器では、波形確認端子ユニットに、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を設けたので、保守・点検者は、わざわざ、感知器の取り付けられている所まで登っていかずとも、波形確認端子ユニットに設けられた、波形確認端子に、オシロスコープ等の波形計測装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0100】請求項14に記載の波形確認端子ユニット付き光電式分離型感知器でも、波形確認端子ユニットに、受光素子が受光した受光量に基づく電圧変動を検出する波形確認端子を設けたので、保守・点検者は、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットに設けられた、波形確認端子に、オシロスコープ等の波形表示装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0101】請求項15に記載の波形確認端子ユニット付き光電式分離型感知器では、受光量表示ユニットは、低所に設置しているため、光電式分離型感知器の施工時やトラブルが発生した場合に、保守・点検者が、その原因を調べるために、わざわざ、感知器の取り付けられている所まで登っていかずとも、受光量表示ユニットで、受光素子の受光量レベルを確認できるので、容易且つ簡単に、光電式分離型感知器のトラブルや誤報の原因を知ることができる。

【0102】請求項16に記載の波形確認端子ユニット付き光電式分離型感知器では、波形確認端子ユニットに、キーにより開け閉めが可能な蓋体を設けているので、キーを持っていない一般人は、蓋体を開けることができない。これにより、一般人が、波形確認端子ユニット内に設けられた波形確認端子に、何等かの電気製品を接続してしまうという事故が生じない。

【0103】請求項17に記載の波形確認端子ユニット付き光電式分離型感知器では、火災受信機に波形確認端子ユニットを設けているので、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機が設置されている、例えば、管理人室等にながら、

波形確認端子ユニットの波形確認端子に、オシロスコープ等の波形表示装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【0104】請求項18に記載の波形確認端子ユニット付き光電式分離型感知器でも、火災受信機に波形確認端子ユニットを設けているので、保守・点検者は、光電式分離型感知器が設置されている現場にいかずとも、火災受信機が設置されている、例えば、管理人室等にながら、波形確認端子ユニットの波形確認端子に、オシロスコープ等の波形表示装置を接続するだけで、受光素子の受光量の正確な波形（電圧波形等）を、容易且つ簡単に、知ることができる。

【図面の簡単な説明】

【図1】本発明に係る受光量表示ユニット付き光電式分離型感知器の一例を概略的に示す構成図である。

【図2】本発明に係る受光量表示ユニット付き光電式分離型感知器を概略的に示すブロック図であり、図2

(a)は、P型用の光電式分離型感知器が用いられた、本発明に係る受光量表示ユニット付き光電式分離型感知器の概略的なブロック図を、また、図2(b)は、R型用の光電式分離型感知器が用いられた、本発明に係る受光量表示ユニット付き光電式分離型感知器の概略的なブロック図を、各々、示している。

【図3】本発明に係る受光量表示ユニット付き光電式分離型感知器で用いる受光量表示ユニットを概略的に示す構成図である。

【図4】本発明に係る波形確認端子ユニット付き光電式分離型感知器を概略的に示すブロック図であり、図4

(a)は、P型用の光電式分離型感知器が用いられた、本発明に係る波形確認端子ユニット付き光電式分離型感知器の概略的なブロック図を、また、図4(b)は、R型用の光電式分離型感知器が用いられた、本発明に係る波形確認端子ユニット付き光電式分離型感知器の概略的なブロック図を、各々、示している。

【図5】本発明に係る波形確認端子ユニット付き光電式分離型感知器で用いる波形確認端子ユニットを概略的に示す構成図である。

【図6】本発明に係る受光量表示ユニット付き光電式分離型感知器の他の例を概略的に示す構成図である。

【図7】図6に示す受光量表示ユニット付き光電式分離型感知器で用いる受光量表示ユニットを概略的に示す構成図である。

【図8】本発明に係る受光量表示ユニット付き光電式分離型感知器を概略的に示すブロック図であり、図8

(a)は、P型用の光電式分離型感知器が用いられた、本発明に係る受光量表示ユニット付き光電式分離型感知器の概略的なブロック図を、また、図8(b)は、R型用の光電式分離型感知器が用いられた、本発明に係る受光量表示ユニット付き光電式分離型感知器の概略的なブ

ロック図を、各々、示している。

【図9】本発明に係る波形確認端子ユニット付き光電式分離型感知器を概略的に示すブロック図であり、図9 (a) は、P型用の光電式分離型感知器が用いられた、本発明に係る波形確認端子ユニット付き光電式分離型感知器の概略的なブロック図を、また、図9 (b) は、R型用の光電式分離型感知器が用いられた、本発明に係る波形確認端子ユニット付き光電式分離型感知器を概略的に示すブロック図を、各々、示している。

【図10】本発明に係る図10 (a) は、P型用の光電式分離型感知器が用いられた、本発明に係る受光量表示ユニット付き光電式分離型感知器の概略的なブロック図を、また、図10 (b) は、R型用の光電式分離型感知器が用いられた、本発明に係る受光量表示ユニット付き光電式分離型感知器の概略的なブロック図を、各々、示している。

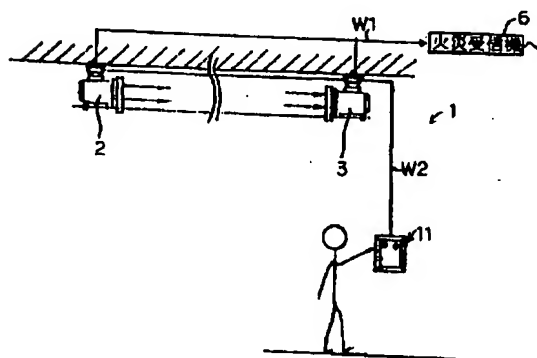
【図11】従来の光電式分離型感知器を概略的に示す構成図である。

【図12】従来の光電式分離型感知器を概略的に示すブロック図であり、図12 (a) は、感知器自体で、火災の判別を行うようにした、従来のP型用の光電式分離型感知器を示しており、また、図12 (b) は、火災受信機で、火災の判別を行うようにした、従来のR型用の光電式分離型感知器を示している。

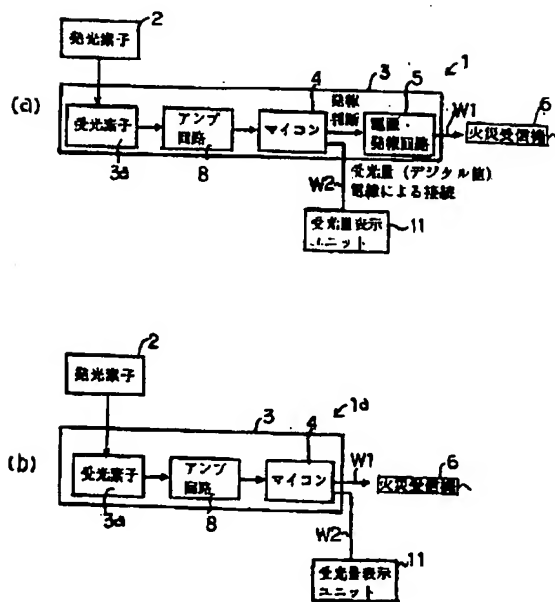
【符号の説明】

- 1、1 a、1 e、1 f、1 g 受光量表示ユニット付き光電式分離型感知器
- 1 c、1 d、1 h、1 i 波形確認端子ユニット付き光電式分離型感知器
- 2 投光器
- 3 受光器
- 3 a 受光素子
- 4 マイクロコンピュータ
- 5 電源・発報回路
- 6 火災受信機
- 8 アンプ回路
- 11、31 受光量表示ユニット
- 11 a 蓋体
- 11 b 受光量表示ユニット本体
- 11 c 鍵穴
- 11 d 鍵部材
- 12 受光量レベル表示手段
- 12 a、12 b、12 c LED
- 13 モード切換スイッチ
- 14 受光量調整手段
- 21 波形確認端子ユニット
- 22、23 出力端子
- 24 グランド線接続用端子
- W1、W2、W3、W4 信号線

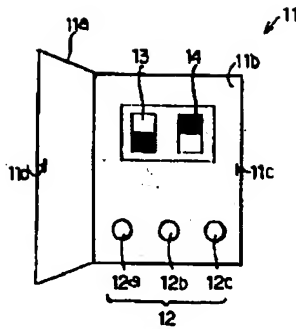
【図1】



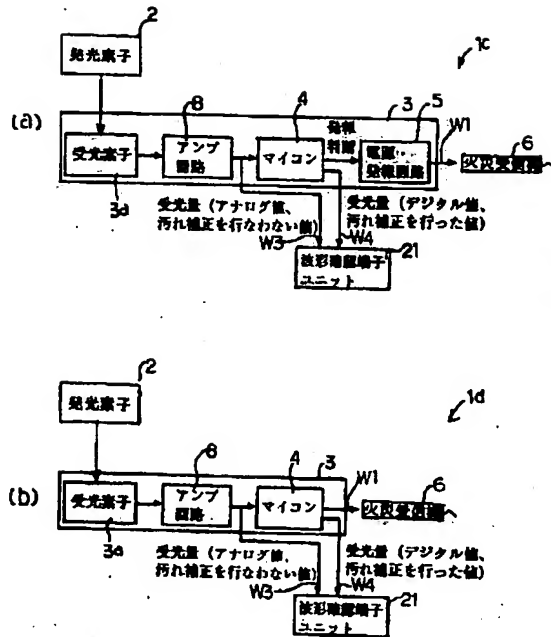
【図2】



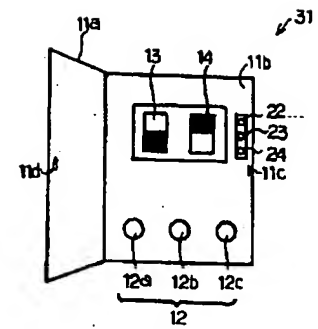
【図3】



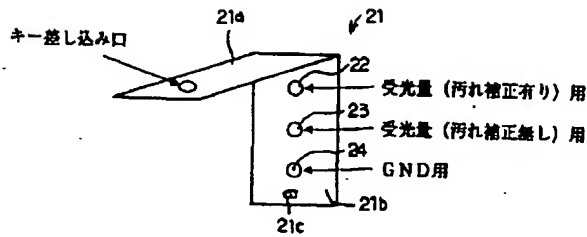
【図4】



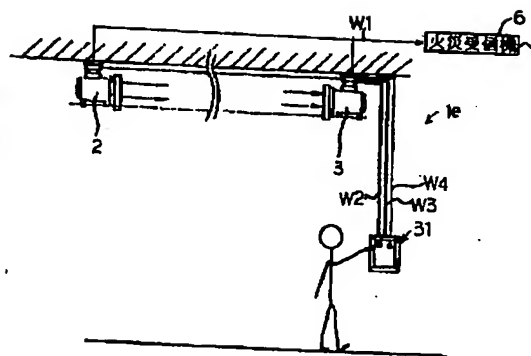
【図7】



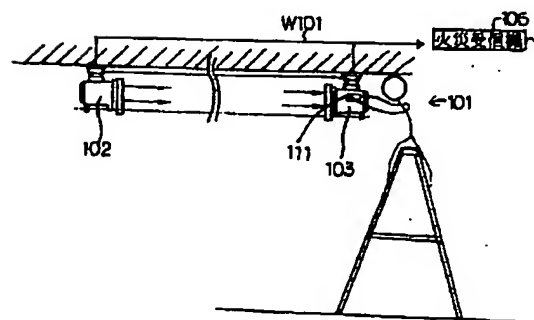
【図5】



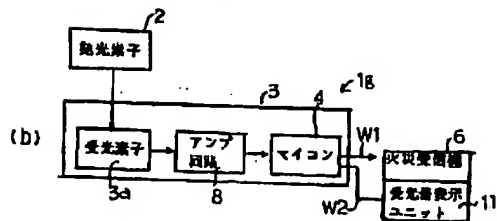
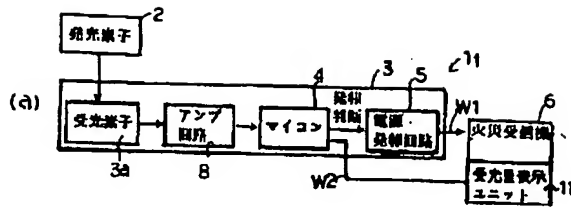
【図6】



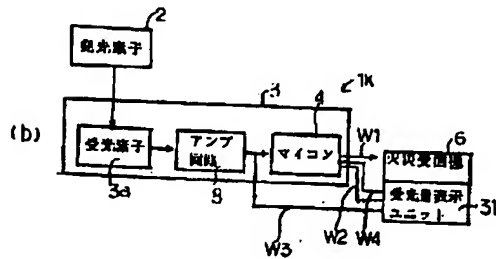
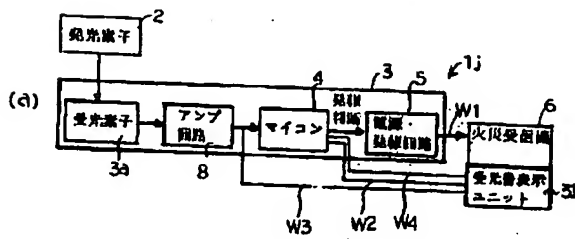
【図11】



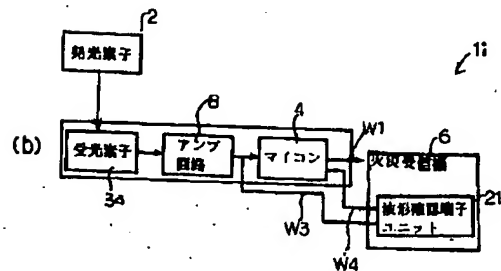
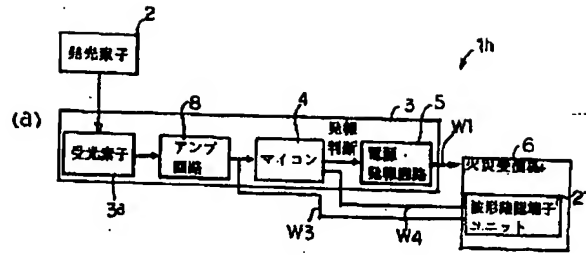
【図 8】



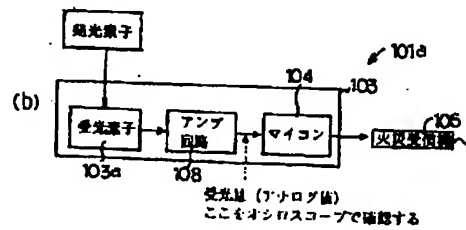
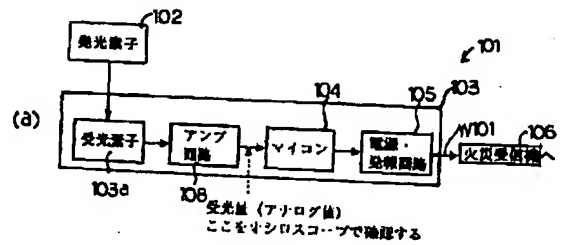
【図 10】



【図 9】



【図 12】



フロントページの続き

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